BUSH HOG®

Backhoes
BH650 / BH750 / BH850 / BH950
Operator's Manual

BUSH HOG®
Performance You Can Count On℠

ASSEMBLY ● OPERATION ● MAINTENANCE

1107 $4.00 50033052

CONGRATULATIONS!

You have invested in the best implement of its type on the market today.

The care you give your Bush Hog implement will greatly determine your satisfaction with its performance and its service life. We urge a careful study of this manual to provide you with a thorough understanding of your new implement before operating, as well as suggestions for operation and maintenance.

If your manual should become lost or destroyed, Bush Hog will be glad to provide you with a new copy. Order from Bush Hog, P. O. Box 1039, Selma, Alabama 36702-1039.

As an authorized Bush Hog dealer, we stock genuine Bush Hog parts which are manufactured with the same precision and skill as our original equipment. Our trained service personnel are well informed on methods required to service Bush Hog equipment, and are ready and able to help you.

Should you require additional information or assistance, please contact us.

YOUR AUTHORIZED
BUSH HOG DEALER

BECAUSE BUSH HOG MAINTAINS AN ONGOING PROGRAM OF PRODUCT IMPROVEMENT, WE RESERVE THE RIGHT TO MAKE IMPROVEMENTS IN DESIGN OR CHANGES IN SPECIFICATIONS WITHOUT INCURRING ANY OBLIGATION TO INSTALL THEM ON UNITS PREVIOUSLY SOLD.

BECAUSE OF THE POSSIBILITY THAT SOME PHOTOGRAPHS IN THIS MANUAL WERE TAKEN OF PROTOTYPE MODELS, PRODUCTION MODELS MAY VARY IN SOME DETAIL. IN ADDITION, SOME PHOTOGRAPHS MAY SHOW SHIELDS REMOVED FOR PURPOSES OF CLARITY. **NEVER OPERATE** THIS IMPLEMENT WITHOUT ALL SHIELDS IN PLACE.

BACKHOES
Operator's Manual

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RETAIL CUSTOMER'S RESPONSIBILITY UNDER THE BUSH HOG WARRANTY

It is the Retail Customer and/or Operator's responsibility to read the Operator's Manual, to operate, lubricate, maintain, and store the product in accordance with all instructions and safety procedures. Failure of the operator to read the Operator's Manual is a misuse of this equipment.

It is the Retail Customer and/or Operator's responsibility to inspect the product and to have any part(s) repaired or replaced when continued operation would cause damage or excessive wear to other parts or cause a safety hazard.

It is the Retail Customer's responsibility to deliver the product to the authorized Bush Hog dealer from whom he purchased it, for service or replacement of defective parts which are covered by warranty. Repairs to be submitted for warranty consideration must be made within forty-five (45) days of failure.

It is the Retail Customer's responsibility for any cost incurred by the Dealer for traveling to or hauling of the product for the purpose of performing a warranty obligation or inspection.

BUSH HOG
Performance You Can Count

LIMITED WARRANTY

Bush Hog warrants to the original purchaser of any new Bush Hog equipment, purchased from an authorized Bush Hog dealer, that the equipment be free from defects in material and workmanship for a period of one (1) year for non-commercial, state, and municipalities' use and ninety (90) days for commercial use from date of retail sale. The obligation of Bush Hog to the purchaser under this warranty is limited to the repair or replacement of defective parts.

Replacement or repair parts installed in the equipment covered by this limited warranty are warranted for ninety (90) days from the date of purchase of such part or to the expiration of the applicable new equipment warranty period, whichever occurs later. Warranted parts shall be provided at no cost to the user at an authorized Bush Hog dealer during regular working hours. Bush Hog reserves the right to inspect any equipment or parts which are claimed to have been defective in material or workmanship.

DISCLAIMER OF IMPLIED WARRANTIES & CONSEQUENTIAL DAMAGES

Bush Hog's obligation under this limited warranty, to the extent allowed by law, is in lieu of all warranties, implied or expressed, **INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE** and any liability for incidental and consequential damages with respect to the sale or use of the items warranted. Such incidental and consequential damages shall include but not be limited to: transportation charges other than normal freight charges; cost of installation other than cost approved by Bush Hog; duty; taxes; charges for normal service or adjustment; loss of crops or any other loss of income; rental of substitute equipment, expenses due to loss, damage, detention or delay in the delivery of equipment or parts resulting from acts beyond the control of Bush Hog.

THIS LIMITED WARRANTY SHALL NOT APPLY:

1. To vendor items which carry their own warranties, such as engines, tires, and tubes.
2. If the unit has been subjected to misapplication, abuse, misuse, negligence, fire or other accident.
3. If parts not made or supplied by Bush Hog have been used in connection with the unit, if, in the sole judgement of Bush Hog such use affects its performance, stability or reliability.
4. If the unit has been altered or repaired outside of an authorized Bush Hog dealership in a manner which, in the sole judgement of Bush Hog, affects its performance, stability or reliability.
5. To normal maintenance service and normal replacement items such as gearbox lubricant, hydraulic fluid, worn blades, or to normal deterioration of such things as belts and exterior finish due to use or exposure.
6. To expendable or wear items such as teeth, chains, sprockets, belts, springs and any other items that in the company's sole judgement is a wear item.

NO EMPLOYEE OR REPRESENTATIVE OF BUSH HOG IS AUTHORIZED TO CHANGE THIS LIMITED WARRANTY IN ANY WAY OR GRANT ANY OTHER WARRANTY UNLESS SUCH CHANGE IS MADE IN WRITING AND SIGNED BY BUSH HOG'S SERVICE MANAGER, POST OFFICE BOX 1039, SELMA, ALABAMA 36702-1039.

Record the model number, serial number and date purchased. This information will be helpful to your dealer if parts or service are required.

MAKE CERTAIN THE WARRANTY REGISTRATION CARD HAS BEEN FILED WITH BUSH HOG/ SELMA, ALABAMA

MODEL NUMBER _____

SERIAL NUMBER _____

DATE OF RETAIL SALE _____

DEALER PREPARATION CHECK LIST

BH650 - BH750 - BH850 - BH950 BACKHOES

BEFORE DELIVERING MACHINE - The following check list should be completed.
Use the Operator's Manual as a guide.

- ❑ Machine properly assembled.
- ❑ All safety decals readable (See decal page).
- ❑ All bolts tightened to torque specifications given in the torque chart.
- ❑ Machine operates properly.
- ❑ Operator's manual has been delivered to owner and he has been instructed on the safe and proper use of the backhoe.

Dealer's Signature _____

⚠ CAUTION:

It is recommended that the tractor be equipped with Rollover Protection System (ROPS) and seat belt be used for all implement operations.

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THIS CHECKLIST TO REMAIN IN OWNER'S MANUAL

It is the responsibility of the dealer to complete the procedures listed above before delivery of this implement to the customer.

Safety Alert Symbol

This Safety Alert Symbol means: **"ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!"**

This symbol is used to call attention to safety precautions that should be followed by the operator to avoid accidents. When you see this symbol, carefully read the message that follows and heed its advice. Failure to comply with safety precautions could result in death or serious bodily injury.

Safety Signs *Signal Words*

The signal words **DANGER, WARNING, AND CAUTION** are used on the equipment safety signs. These words are intended to alert the viewer to the existence and the degree of hazard seriousness.

⚠ DANGER

White letters on **RED**

This signal word indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

Black letters on **ORANGE**

This signal word indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury

It may also be used to alert against unsafe practices.

⚠ CAUTION

Black letters on **YELLOW**

This signal word indicates a potentially hazardous situation exist which, if not avoided, may result in minor or moderate injury.

It may also be used to alert against unsafe practices.

IMPORTANT SAFETY PRECAUTIONS

This symbol is used to call attention to safety precautions that should be followed by the operator to avoid accidents. When you see this symbol, carefully read the message that follows and heed its advice. Failure to comply with safety precautions could result in serious bodily injury.

In addition to the design and configuration of equipment, hazard control and accident prevention are dependent upon the awareness, concern, prudence and proper training of personnel in the operation, transport, maintenance and storage of equipment. Lack of attention to safety can result in accident, personal injury, reduction of efficiency and worst of all—loss of life. Watch for safety hazards and correct deficiencies promptly. Use the following safety precautions as a general guide to safe operations when using this machine. Additional safety precautions are used throughout this manual for specific operating and maintenance procedures. Read this manual and review the safety precautions often until you know the limitations.

THE TRACTOR

1. Read the tractor operator's manual to learn how to operate your tractor safely. Failure to do so could result in serious injury or death and equipment damage.
2. It is recommended that tractor be equipped with Rollover Protective System (ROPS) and a seat belt be used for all loader operations.
3. Add wheel ballast or front weight for stability.
4. Move wheels to the tractor manufacturer's widest recommended settings to increase stability.
5. For better stability, use tractor with wide front axle rather than tricycle front wheels.
6. Move and turn the tractor at low speeds.
7. Stop tractor engine, place transmission in park (or neutral), engage parking brake, lower loader arms to ground, cycle all hydraulic controls to relieve pressure, allow machine moving parts to stop, remove ignition key to prevent unauthorized person from starting engine before dismounting tractor or servicing, repairing, or making adjustments to the equipment.
8. Wear personal protective equipment (PPE) such as, but not limited to, protection for eyes, ears, lungs, head, hands and feet when operating, servicing, or repairing equipment. Avoid wearing loose clothing or jewelry that may catch and entangle on equipment moving parts.

THE BACKHOE

1. DO NOT operate the backhoe unless it is rigidly attached to the tractor or skid steer loader.
2. KNOW your controls. Read this operator's manual and the manual provided with your tractor. Learn how to stop the tractor, the engine and the backhoe quickly in an emergency.
3. PROVIDE adequate front end weight to counter-balance the backhoe at all times. 20% of the total tractor, loader and backhoe weight must be on the tractor front axle. If unsure of weight distribution, determine at a weight scale. Total vehicle weight , including backhoe and counter weights, must not exceed the ROPS certificate for gross vehicle weight.
4. BE SURE the area is clear of overhead or underground utilities or other hazards.
5. POSITION a barricade around the work area.
6. KEEP all bystanders a safe distance away.
7. DO NOT attempt to enter operator's platform of backhoe by using the stabilizers as a step.
8. OPERATE from the backhoe operator's seat only.
9. ALLOW only one person to operate the backhoe at any time.
10. DISENGAGE safety locks as shown in Figures 1 & 3 before attempting to operate the backhoe.
11. NEVER dig with the backhoe unless the stabilizers are properly set.

SAFETY PRECAUTIONS CONTINUED

12. DO NOT dig under stabilizers or tractor backhoe. Soft ground or sandy soil can cause cave-ins.
13. KEEP BUCKET away from the stabilizer area to avoid possible stabilizer damage.
14. ALWAYS swing bucket uphill to dump when on a hillside and keep loaded bucket low.
15. SET BRAKES and block wheels when operating on hills and banks to avoid dangerous runaway.
16. WATCH for overhead wires. DO NOT touch wires with any part of the backhoe.
17. NEVER allow a person to work under a raised bucket.
18. NEVER lift a person with the backhoe.
19. DO NOT use the backhoe as a battering ram. Use the backhoe only for digging.
20. ALWAYS lower the backhoe bucket and stabilizers to the ground, shut off engine, and apply the parking brake before getting off unit, or when not digging.
21. NEVER leave the tractor unattended with the engine running.
22. DO NOT attempt to raise the tractor off the ground or move the tractor forward or backward using the backhoe dipperstick or bucket.

TRANSPORTATION

1. ALWAYS engage safety locks before transporting backhoe. See Figures 1 & 3.
2. DO NOT drive the tractor near the edge of a ditch or excavation.
3. ALWAYS use accessory lights and devices when transporting on a road or highway to warn operators of other vehicles. Check your local government regulations.
4. BE SURE the SMV emblem is visible to the rear.

ADJUSTMENTS AND INSPECTION

1. CHECK pins that attach backhoe to tractor and all pivot pins for tightness several times daily. Replace any parts that are bent, broken or missing.
2. ALWAYS engage safety locks before servicing backhoe. See Figures 1 & 3.
3. DO NOT oil, grease, or adjust the backhoe while it is in motion. For greasing, see Service section for details.
4. DO NOT change any backhoe relief valve settings. They are factory set for best backhoe performance and safety.
5. PROTECT YOUR EYES - WEAR SAFETY GLASSES.
6. GUARD AGAINST INJURY when driving connecting pins or performing any repair in which particles can chip from work piece or striking tool.
7. DO NOT remove any guards on backhoe or tractor.

AVOID HIGH-PRESSURE FLUIDS

ESCAPING fluid under pressure can have sufficient force to penetrate the skin and cause serious injury. Be sure to stop engine and relieve all pressure before disconnecting lines. Be sure all connections are tight and that lines, pipes, and hoses are not damaged before applying pressure to the system. Fluid escaping from a very small hole can be almost invisible. Use a piece of cardboard or wood - not your hands-to search for suspected leaks.

SEE A DOCTOR at once if injured by escaping fluid. Serious infection or gangrene can develop if proper medical treatment is not administered immediately.

IMPORTANT FEDERAL LAWS AND REGULATIONS* CONCERNING EMPLOYERS, EMPLOYEES AND OPERATIONS.

*(This section is intended to explain in broad terms the concept and effect of the following federal laws and regulations. It is not intended as a legal interpretation of the laws and should not be considered as such).

U.S. Public Law 91-596 (The Williams-Steiger Occupational Safety and Health Act of 1970) OSHA

This Act Seeks:
"...to assure so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources..."

DUTIES

Sec. 5 (a) Each employer—
(1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;
(2) shall comply with occupational safety and health standards promulgated under this Act.
(b) Each employee shall comply with occupational safety and health standards and all rules, regulations and orders issued pursuant to this Act which are applicable to his own actions and conduct.

OSHA Regulations

Current OSHA regulations state in part: "At the time of initial assignment and at least annually thereafter, the employer shall instruct every employee in the safe operation and servicing of all equipment with which the employee is, or will be involved." These will include (but are not limited to) instructions to:

Keep all guards in place when the machine is in operation;

Permit no riders on equipment;

Stop engine, disconnect the power source, and wait for all machine movement to stop before servicing, adjusting, cleaning or unclogging the equipment, except where the machine must be running to be properly serviced or maintained, in which case the employer shall instruct employees as to all steps and procedures which are necessary to safely service or maintain the equipment.

Make sure everyone is clear of machinery before starting the engine, engaging power, or operating the machine.

EMPLOYEE TRACTOR OPERATING INSTRUCTIONS:

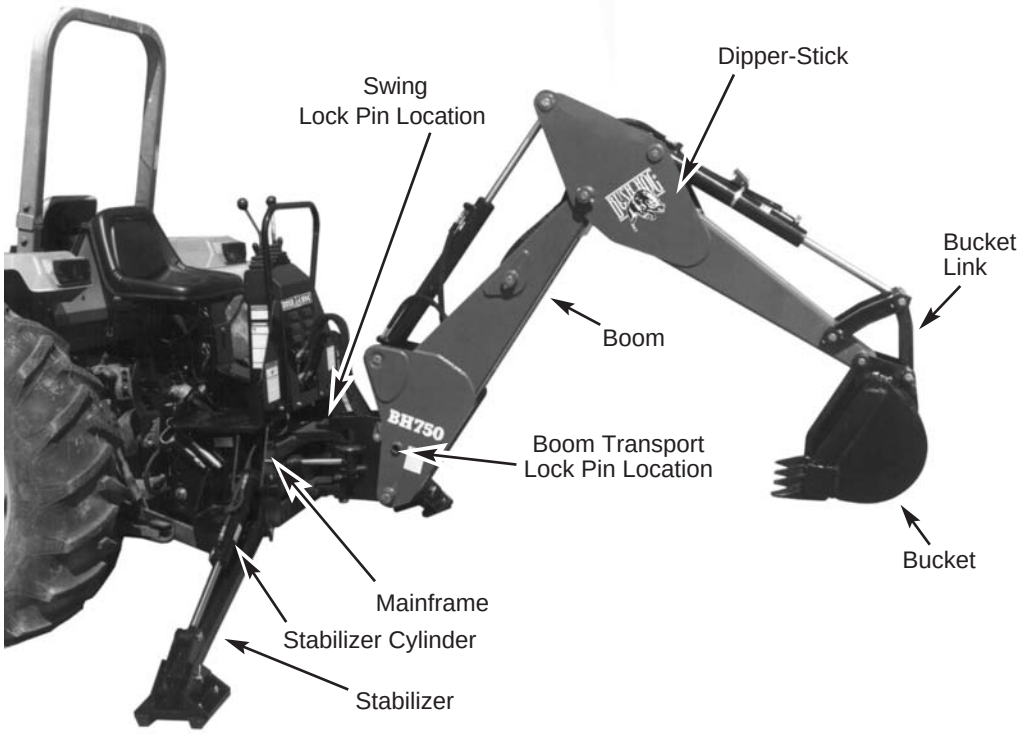
1. Securely fasten your seat belt if the tractor has a ROPS.
2. Where possible, avoid operating the tractor near ditches, embankments, and holes.
3. Reduce speed when turning, crossing slopes, and on rough, slick, or muddy surfaces.
4. Stay off slopes too steep for safe operation.
5. Watch where you are going, especially at row ends, on roads, and around trees.
6. Do not permit others to ride.
7. Operate the tractor smoothly - no jerky turns, starts, or stops.
8. Hitch only to the drawbar and hitch points recommended by tractor manufacturers.
9. When tractor is stopped, set brakes securely and use park lock if available.

Child Labor Under 16 Years Old

Some regulations specify that no one under the age of 16 may operate power machinery. It is your responsibility to know what these regulations are in your own area or situation. (Refer to U.S. Dept. of Labor, Employment Standard Administration, Wage & Home Division, Child Labor Bulletin #102.)

GENERAL OPERATION

Figure 1



⚠ CAUTION

To avoid possible injury, observe the following safety rules BEFORE OPERATING the backhoe:

1. BE SURE area is clear of underground utilities or other hazards.

2. POSITION barricade around work area.

3. PROVIDE adequate front end weight to counter-balance tractor at all times. 20% of the total tractor, loader and backhoe weight must be on the tractor front axle.

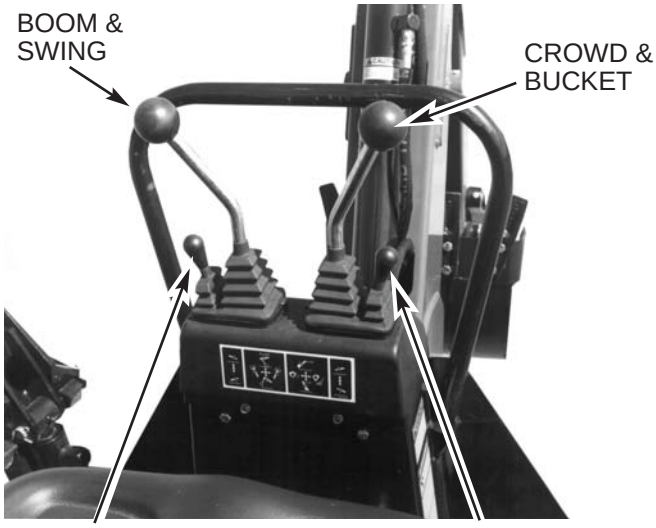
4. Keep bystanders a safe distance away.

DIRECTIONS: The terms right, left, front and back shall be determined from the position of the operator when seated in the operating position on the backhoe.

Engine Speed

The speed at which the backhoe operates is partially dependent on engine RPM. Use a moderate engine speed to start and increase it as your experience permits. Refer to "SPECIFICATIONS" for hydraulic flow volume requirements. When powering from tractor systems with higher output, reduce engine RPM to obtain acceptable backhoe operating speed.

Figure 2 Control Handles



CONTROLS

The backhoe has two major control levers plus the stabilizer control levers. These controls are located on the control console directly ahead of the operator. See Figure 2. The following is a list of the controls, with the function of each, reading from left to right.

1. Left Hand Stabilizer: Push lever forward, the LH stabilizer lowers. Pull lever back, the LH stabilizer raises.

2. Boom/Swing: Push lever forward, the boom moves down, away from the operator. Pull lever back, the boom moves up, toward the operator.

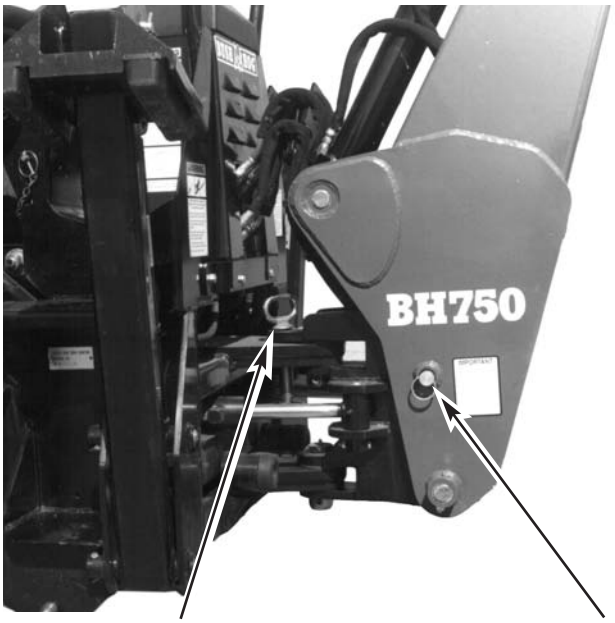
The Boom/Swing Control Lever has an added "float" function. A detent or stop should be felt when the lever is pushed forward to move the boom down. Pushing the lever forward more will overcome the detent and cause the boom to float, or move down or up freely, depending on the forces acting on it. When the lever is released it should return to the center, neutral position.

Move lever to the left, the backhoe swings to the left. Move lever to the right, the backhoe swings to the right.

By moving the lever to one of the intermediate positions, the boom can be swung left or right at the same time it is being raised or lowered, performing the two operations simultaneously.

SWING LEFT AND LOWER the boom by moving the control lever forward and to the left.

Figure 3 Safety Locks



SWING LEFT AND RAISE the boom by moving the control lever back and to the left.

SWING RIGHT AND LOWER the boom by moving the lever forward and to the right.

SWING RIGHT AND RAISE the boom by moving the lever back and to the right.

3. Crowd/Bucket: Push lever forward, the dipperstick moves out, away from the operator. Pull lever back, the dipperstick moves in, toward the operator.

Move lever to left, the bucket curls in. Move lever to right, the bucket extends out.

By moving the lever to one of the intermediate positions, the dipperstick can be extended or retracted at the same time the bucket is being loaded or dumped.

EXTEND AND LOAD the bucket by moving the lever forward and to the left.

RETRACT AND LOAD the bucket by moving the lever back and to the left.

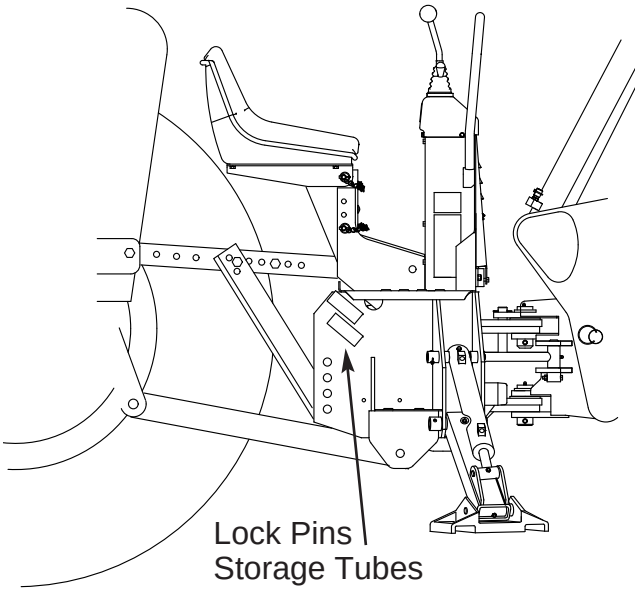
EXTEND AND DUMP the bucket by moving the lever forward and to the right.

RETRACT AND DUMP the bucket by moving the lever back and to the right.

The two operations of the boom/swing lever, combined with the two operations performed by the crowd/bucket control lever, provide four simultaneous operations from the two levers, keeping cycle time to a minimum.

4. Right Hand Stabilizer: Push lever forward, the RH stabilizer lowers. Pull lever back, the RH stabilizer raises.

Figure 3a



In general, the direction of movement of a control lever corresponds to the movement of the operating member.

OPERATING THE BACKHOE

⚠ CAUTION

To avoid possible injury, observe the following safety rules WHEN OPERATING the backhoe.

1. DISENGAGE safety lock pins as shown in Figure 3 before attempting to operate the backhoe. Store lock pins in angled tubes located at the rear right hand side of the backhoe below the foot platform. See Figure 3a.

2. OPERATE from the backhoe operator's seat only.

3. LOWER the stabilizers until the rear of the tractor is totally supported by them. NOTE: Rear tires should not come up off of the ground. See diagram on Page 11.

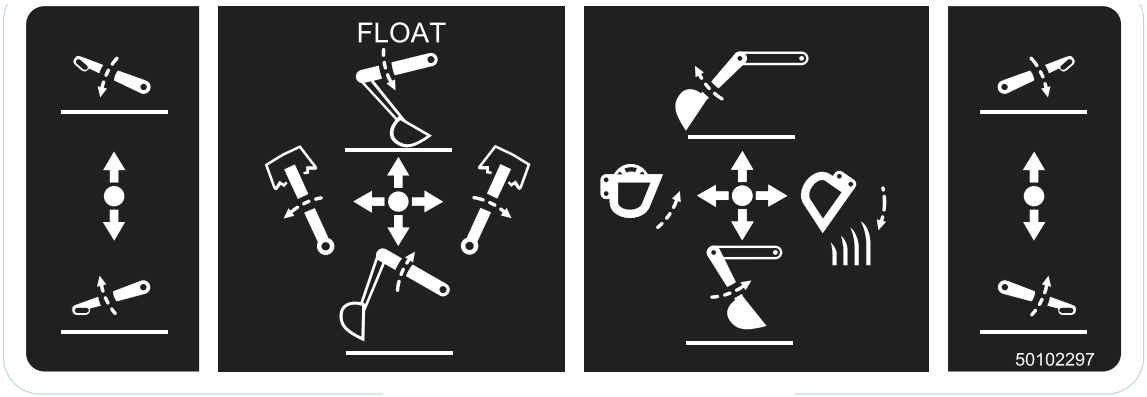
4. DO NOT dig near the stabilizers.

5. DO NOT touch overhead wires with any part of the backhoe.

6. DO NOT attempt to raise the tractor off the ground or move the tractor forward or backward using the backhoe dipperstick or bucket.

7. DO NOT lose stability by swinging the bucket downhill when positioned on a slope.

8. DO NOT lower the backhoe boom using the "float" function. It will freefall, and could result in injury to bystanders or damage to the backhoe.



Location: Back Of Control Panel

It is not difficult to become an efficient operator. Control lever operating decal is located on back of the control console. Study this decal. It will assist you in becoming familiar with the controls.

Smooth, light handling of the controls will result in the most efficient backhoe operation.

Operate the backhoe control levers to become familiar with their speed and movements. The engine speed and the size of the hydraulic system will determine the speed of cylinder operation. When powering from tractor systems with higher output than required, reduce engine RPM to obtain acceptable backhoe operating speed. If backhoe is to be mounted to a tractor or to a skid steer loader with a hydraulic flow rate exceeding 12 gallons per minute (gpm), then the backhoe must be equipped with a Flow Divider Kit. Refer to “Flow Divider Kit” section of this manual for assembly and installation instructions.

Swing the boom several times to practice controlling the speed of swing. Do not operate the swing more than 45° each way for the first few times, then gradually increase the arc.

IMPORTANT: To avoid damage to the backhoe, do not slam unit into the rubber bumpers when swinging the boom right or left.

The boom “float” function may be used during digging to eliminate down pressure when cleaning the bottom of a trench. The primary purpose of the boom “float” function is to protect the operator from serious injury in the event that the backhoe or tractor hitch would

Best results are obtained by digging near the center of the swing arc so material can be dumped on either side.

As the operator becomes more familiar with the operation of the backhoe, it will be common practice to operate two controls at one time. For example, with the bucket extended and the dipperstick extended, the lift control and crowd control can be operated together to bring the bucket toward the operator with down pressure on it. As the dipperstick approaches the operator, the crowd and bucket controls can be operated to close the bucket and trap the material. At the end of the stroke, the lift and crowd controls are operated to move the load up and away from the operator to save time in clearing the excavation.

This dual operation of controls will speed and simplify the digging operation. Normally the two or more movements will not be equal or even simultaneous, but as the pressure within the cylinders changes, and the resistance on an operating member of the hoe lessens, it will begin to move. It is balancing the force of one member against the other.

NOTE: Actuating the bucket is the key to powerful digging. Operating the crowd and bucket controls simultaneously will insure a full bucket and prevent waste motion and time.

TRANSPORTING THE BACKHOE

IMPORTANT: To prevent serious damage to the tractor, read and follow the instructions on the following decal:

IMPORTANT
IMPROPER TRANSPORTING METHODS CAN CAUSE SERIOUS DAMAGE TO TRACTOR.
• ENGAGE BOTH SAFETY LOCKS WHEN TRANSPORTING BACKHOE.
• TRAVEL SLOWLY OVER ROUGH TERRAIN.
• WHEN TRANSPORTING ON TRUCK OR TRAILER, LOWER BACKHOE BOOM SO BUCKET RESTS FIRMLY ON BED. APPLY RESTRAINTS TO TRACTOR, NOT TO BACKHOE OR BACKHOE ATTACHING KIT.
50102295

Location: Right Side of Boom

⚠ CAUTION

To avoid possible injury, observe the following safety rules when transporting the backhoe:

1. ALWAYS engage safety locks as shown on Figs. 1 and 3 when transporting backhoe.

2. TRAVEL SLOWLY over rough terrain, on hillsides, and around curves to prevent tipping.

3. DO NOT drive the tractor near the edge of a ditch or excavation.

4. USE accessory lights and SMV emblem when traveling on highways.

Before leaving backhoe operator's seat, position the backhoe for transport by raising boom, crowding dipperstick in, swinging to center and raising the stabilizers.

When transporting for long distances, periodically examine the backhoe and raise stabilizers and bucket back up to the full transport height. It is normal for the backhoe to slowly settle while being transported.

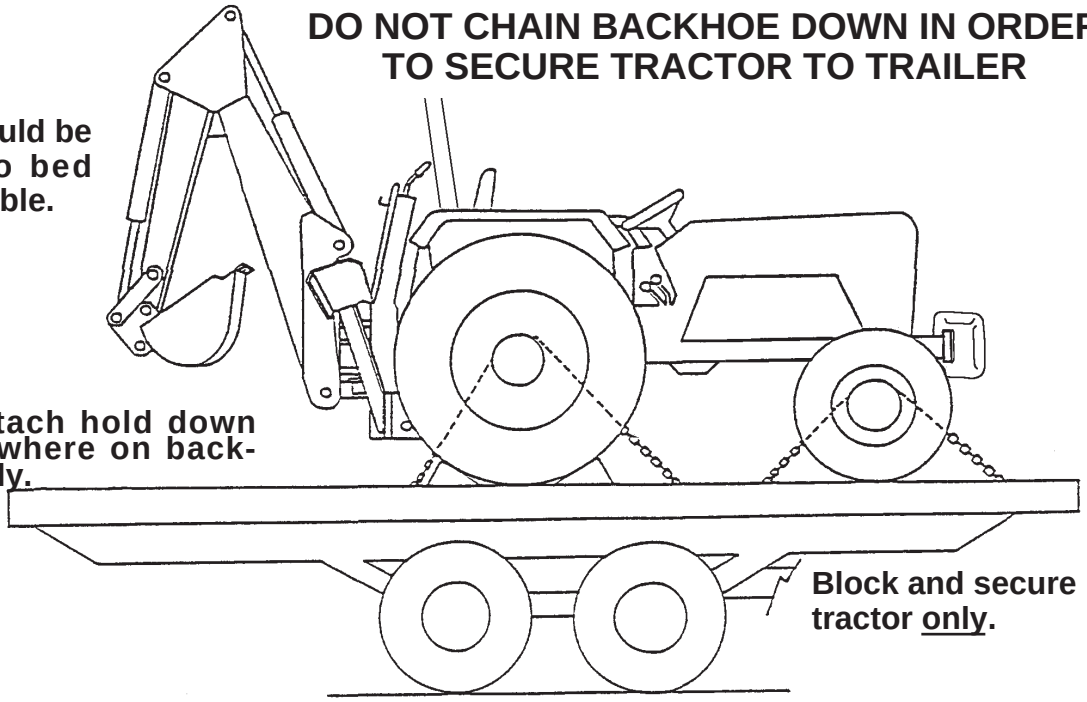
WHEN TRANSPORTING

Figure 4

⚠ CAUTION

DO NOT CHAIN BACKHOE DOWN IN ORDER TO SECURE TRACTOR TO TRAILER

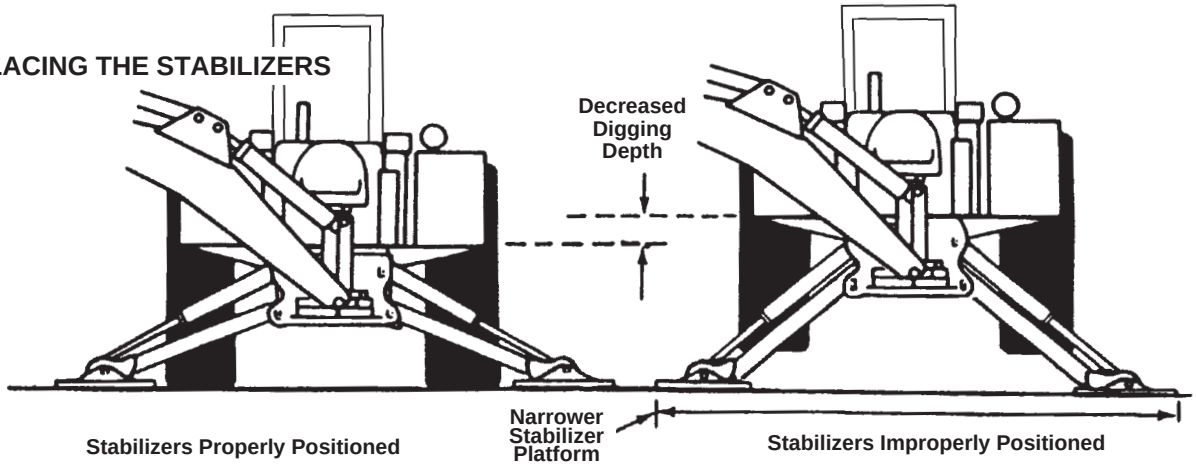
Note: Bucket should be lowered to bed when possible.



DO NOT attach hold down chains anywhere on backhoe assembly.

Block and secure tractor only.

PLACING THE STABILIZERS

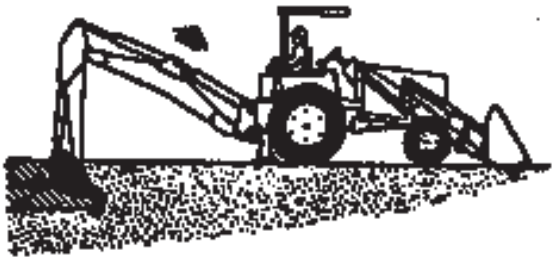


Set the stabilizers to remove weight from the rear wheels. The wheels are to remain touching the ground as this provides for the widest stabilizer stance and the lowest center of gravity. Raising the wheels off the ground will not only reduce stability and digging depth, but will impair performance and impose unnecessary stress on the unit.

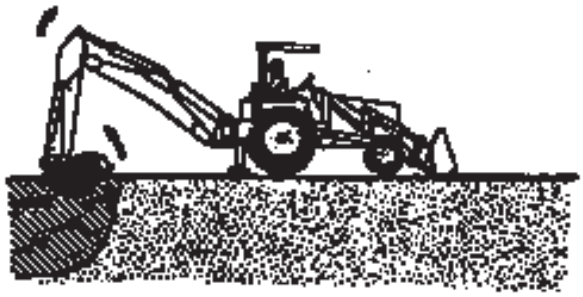
FILLING THE BUCKET

Control the bucket attitude throughout the digging cycle to keep teeth at the proper angle for best penetration. This will minimize dragging and scraping the bucket through the ground.

When digging in hard-packed soil, bucket penetration can be increased by applying down pressure with the boom while crowding in and curling the bucket. If the crowd action "stalls" it may be necessary to apply lift occasionally during the digging cycle to correct the bucket depth.

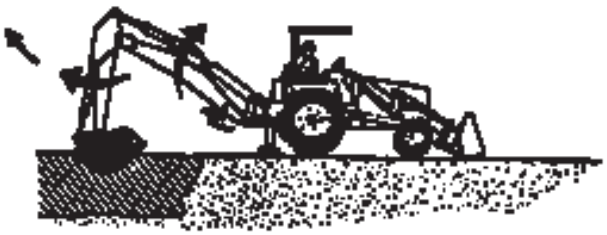


To obtain a cleaner trench and avoid the buildup of material directly in front of the backhoe, crowd out and completely curl the bucket while starting to lift it from the excavation. In this way, excess material will fall back into the excavation.



DUMPING THE BUCKET

To dump the bucket at the end of the digging cycle, lift the bucket clear of the trench while crowding it out and swinging it to the spoil pile.

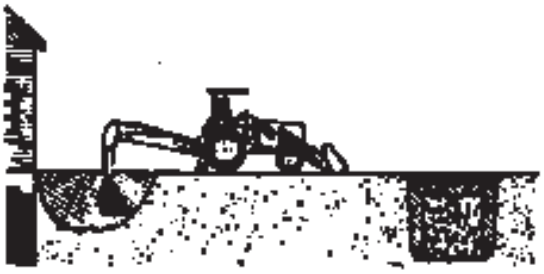


As the pile is approached, dump the bucket. When the bucket is empty, the dipperstick and bucket are in position to resume digging upon return to the trench.

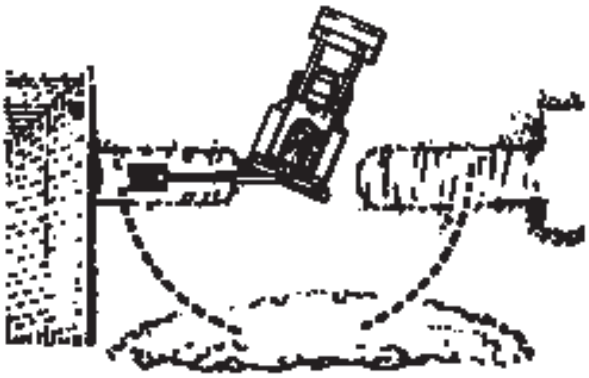
IMPORTANT: *Avoid constant jarring or hammering-type contact between the spoil pile and the loaded bucket, as this may cause premature wear to the backhoe pins and bushings.*

TRENCHING BETWEEN A BUILDING AND OPEN EXCAVATIONS

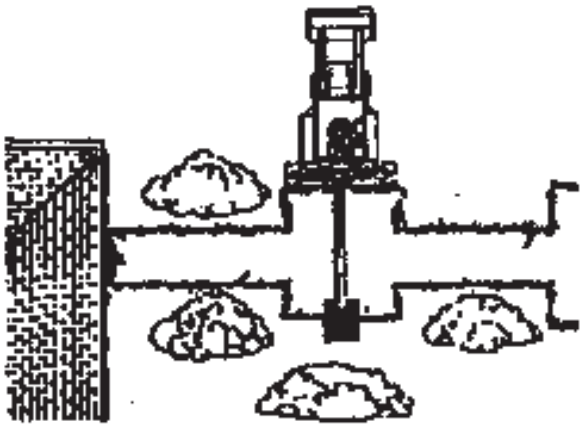
Start the trench at the building. Trench out halfway to the excavation. Then start trenching from the excavation to the first trench. Dig toward the first trench until there is just enough room to move the unit out between the two trenches.



Position the unit so the backhoe swing post is over the centerline of the trench connection. Dig with the backhoe at extreme swing positions, and in as close to the stabilizers as possible. Pile the spoil on the opposite side of the trenches.

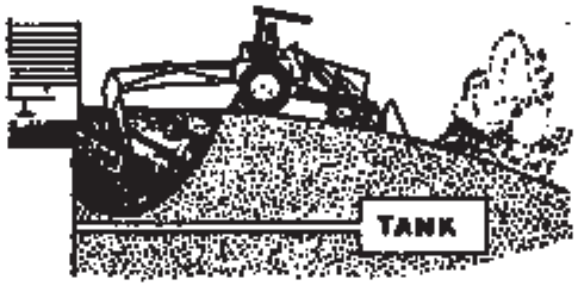


Position the unit forward with the lift and crowd levers so the two trenches can be connected. Pile the spoil on the opposite side of the trench.



SIDE SLOPE EXCAVATING OR TRENCHING

Dig with the backhoe uphill whenever possible.



Level the backhoe on slopes with the stabilizers to dig plumb trenches, or use the backhoe or loader to cut a level slot for the uphill wheel and stabilizer. Pile the spoil from the slot on the low side.

When on the side of a steep slope, cut a level surface along the uphill side of the trench with the loader.

Pile the spoil of the cut downhill. When digging, pile the spoil of the trench uphill.

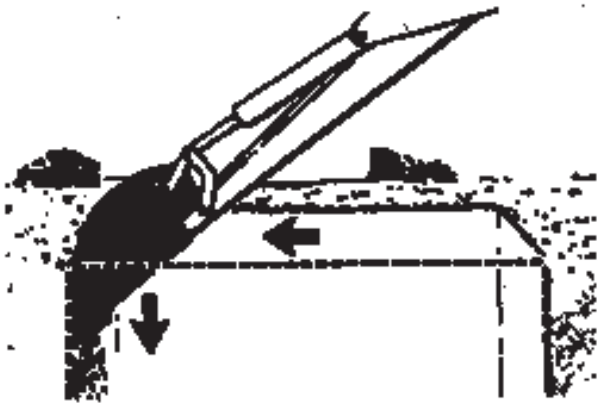
Dig field trenches progressively. As soon as one trench is completed, have the workmen lay the tile. Start the next trench, using the spoil to fill the previous trench.

MISCELLANEOUS

When finishing straight walls or bellholes in sandy soil, use a platform under the rear tires and the stabilizers. The platform distributes the load over a larger area and lessens the possibility of a cave-in. The platform also tends to keep the unit from creeping rearward if hard digging is encountered.

FINISHING STRAIGHT WALLS

Finish the far wall by crowding out while forcing the bucket down from the boom. Actuate the bucket (curl out) to keep the bottom of the bucket vertical.



To finish the near wall, lift up and crowd in. Keep the edges of the bucket horizontal.

BACKFILLING

Backfill by lifting the bucket over the spoil pile and then crowding in. Pull both the crowd and lift levers for smooth, even backfilling.

IMPORTANT: Do not backfill by using the swing circuit and dragging the bucket sideways. Doing so can cause damage to the dipperstick, boom, or swing cylinders and/or the mainframe.

SERVICE

⚠ CAUTION

To avoid possible injury, observe the following safety rules <u>WHEN</u> <u>SERVICING</u> the backhoe:

1. ENGAGE safety locks as shown in Figures 1 & 3 before servicing the backhoe.

2. DO NOT oil, grease or adjust the backhoe while it is in motion.

3. DO NOT change any backhoe relief valve settings. They are factory set for best performance and safety.

4. ESCAPING FLUID under pressure can have sufficient force to penetrate the skin and cause serious injury. Be sure to relieve all pressure before disconnecting lines. Be sure all connections are tight and that lines, pipes and hoses are not damaged before applying pressure to the system.

5. FLUID ESCAPING from a very small hole can be almost invisible. Use a small piece of cardboard or wood - <u>not</u> <u>your</u> <u>hands</u> - to search for suspected leaks.

6. SEE A DOCTOR AT ONCE if injured by escaping fluid. Serious infection or gangrene can develop if proper medical treatment is not administered immediately.

7. PROTECT YOUR EYES - Wear safety glasses. Guard against injury when driving connecting pins or performing any repair in which particles can chip from work piece or striking tool.

BEGINNING OF SEASON

Remove all protective coverings.

Check hydraulic hoses for deterioration and replace, if necessary.

Lubricate all grease fittings and oil handle linkages.

Check hydraulic system for loss of fluid and, if necessary, fill to proper level.

Tighten all loose bolts, nuts and setscrews.

Inspect bucket teeth and, if necessary, sharpen or replace them.

Operate the backhoe slowly for a short time before placing the unit under full load.

Bleeding Backhoe Hydraulic System

If the hydraulic hoses have been disconnected from the backhoe or tractor, all trapped air must be removed after the hoses are connected. Start tractor engine and operate backhoe through all movements fully several times to purge the system of air.

Hydraulic System Hoses

Oil leaks in the pressure side of the system can be located by carefully inspecting the external area of the hoses and fittings.

Check the return side of the system for leaks by examining the oil in the reservoir. If air is being drawn into the system, the oil will contain air bubbles and appear to foam.

When tightening connections, always use two wrenches.

IMPORTANT: Do not over-tighten fittings. Make them just tight enough to eliminate leaks.

<u>NEVER</u> use teflon tape on pipe thread fittings. Always use a paste-type sealer.

Hoses on any backhoe are very severely worked and will fail in time. Examine them regularly and replace any that show signs of failure. Pay careful attention to the routing of hoses so they can move fully and freely without kinking, and cannot be pinched or cut by any part of the backhoe.

Hydraulic System Reservoir

On PTO pump systems, maintain the reservoir oil at the proper level by looking at the dipstick. The dipstick/breather cap is located directly behind the right side of the foot platform on the backhoe. When checking oil level, the backhoe should be extended to full reach with the bucket rolled back and resting on the ground. All cylinders are retracted except for the boom cylinder. Do not overfill; oil may be forced out of the breather cap.

Fill with:

SAE 10W40 engine oil with API “SF/SG” classification in northern climates.

SAE 40W engine oil with API “SF/SG” classification in southern climates.

Change oil every 200 hours or more often if necessary. To change oil, extend backhoe to full reach with bucket rolled back and resting on ground. Turn off tractor PTO and shut down tractor engine. Unseat breather cap from fill tube and remove drain plug from left rear underside of hydraulic reservoir using 1/4” hex wrench. Drain oil from reservoir and replace drain plug. **Refill reservoir with 7 gallons of fresh oil following guidelines listed above for proper oil selection.** Reseat breather cap and start engine and PTO. After cycling all backhoe functions several times to remove any air from hydraulic system, check oil level in reservoir with backhoe extended to full reach and bucket rolled back and resting on ground. If oil level on dipstick is below “ADD” line, add enough oil to bring level up to “FULL” line. **DO NOT** overfill reservoir or oil may be forced out through breather cap during backhoe operation.

If the tractor system supplies the hydraulic power, service according to the tractor instruction manual.

TOOTH REPLACEMENT

Bolt-On tooth points, when worn, can be replaced by removing the hardware that connects it to the cutting edge. Install new tooth and replace hardware if necessary. (Figure 5)

Roll-Pinned tooth points, when worn, can be replaced by driving out the roll pin with a hammer and punch. Install the new tooth using a new roll pin and hammer. (Figure 6)

Figure 5
Bolt-On Tooth

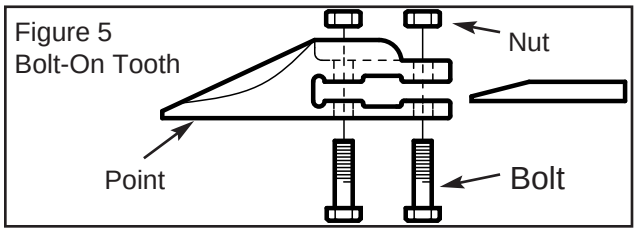
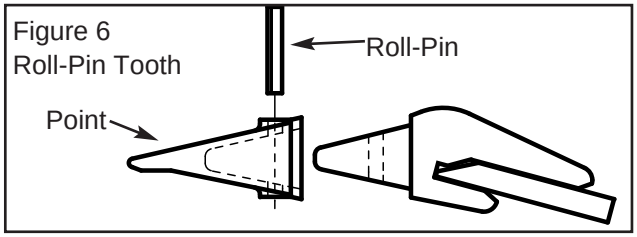


Figure 6
Roll-Pin Tooth



Tightening Nuts and Bolts

Periodically, check to be sure all bolts and nuts are tight. See torque chart, page 45 .

Check all pivot pins for cotter pins, washers and retainers; if missing, replace.

LUBRICATION

IMPORTANT: Avoid excessive greasing. Dirt collects on exposed grease and increases wear greatly. After greasing, wipe off excessive grease from fittings.

Economical and efficient operation of the backhoe is dependent upon regular and proper lubrication of all moving parts with a quality lubricant.

All parts provided with grease fittings should be lubricated with a good quality chassis lube type grease. If any grease fittings are missing, replace them immediately. Clean all fittings thoroughly before using grease gun.

Lubricate all grease fittings at least twice daily, once at the beginning of operation and again approximately halfway through the work day.

Lower stabilizers to the ground and lower boom so bucket rests on the ground as shown in Figures 7 and 8. Refer to these illustrations for the location of all grease fittings.

IMPORTANT: Before greasing boom to swing frame pivot (*) shown in Figures 7 and 8, raise boom and install transport lock pin shown in Figure 1.

On **Models BH650, BH750, BH850 and BH950** the following locations should be oiled with SAE30 oil:

A. All Control Handle Linkages
B. Seat Bracket Pivot

Figure 7 Lubrication Points
BH650 & BH750

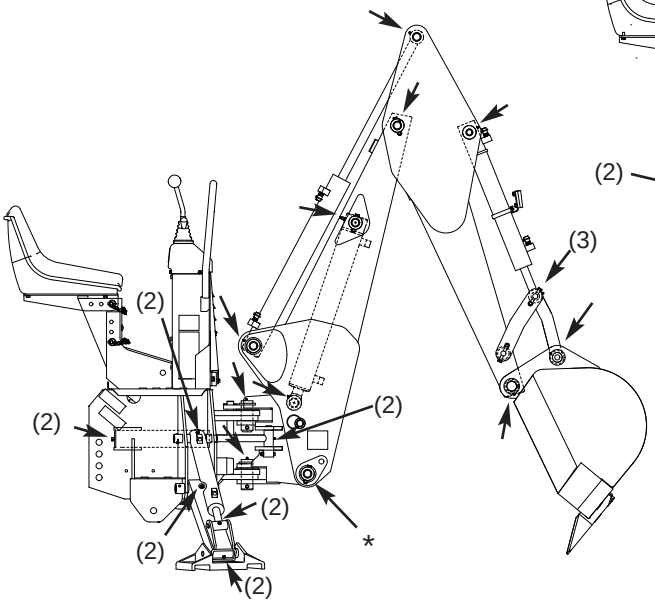
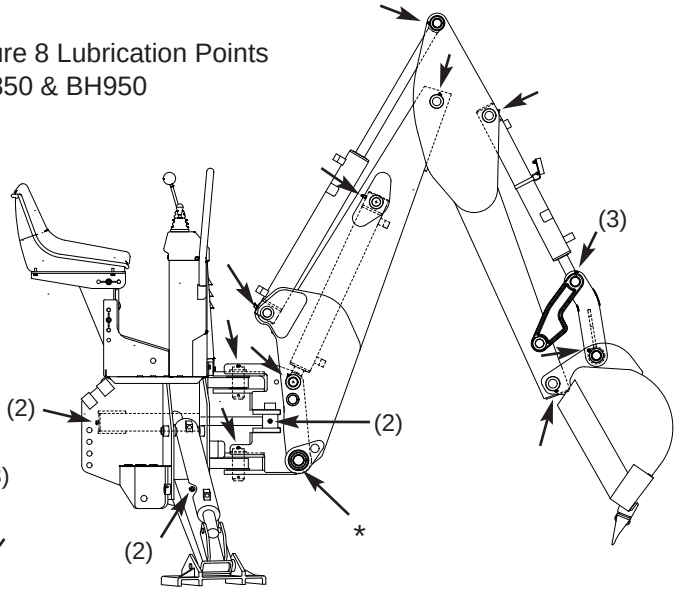
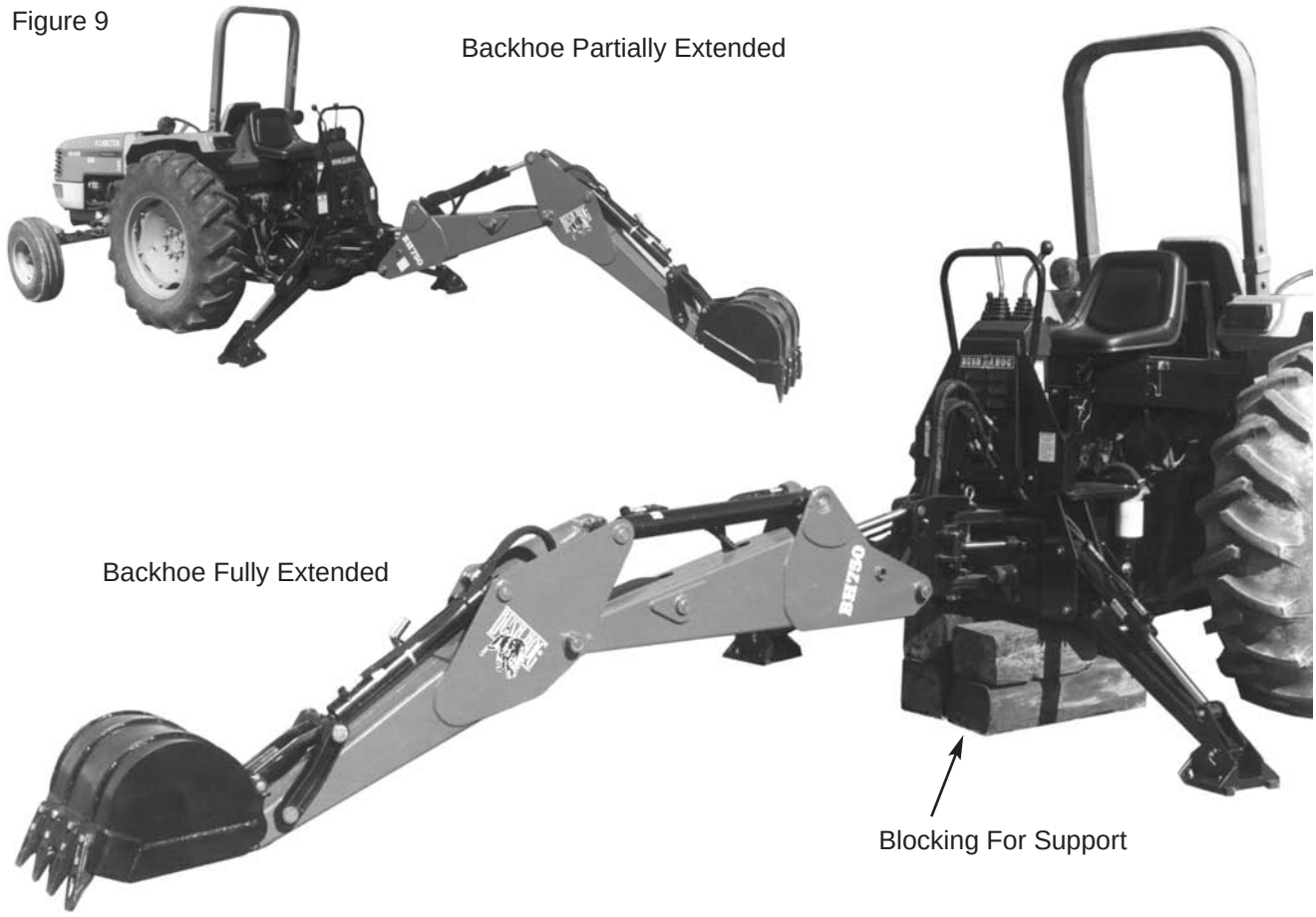


Figure 8 Lubrication Points
BH850 & BH950



REMOVAL FROM TRACTOR - STORAGE

Figure 9



The backhoe is self-assisting during the installation and removal procedures. For removal and storage, follow these steps:

1. **Install the swing safety lock pin** as shown in Figures 1 and 3.

2. Stretch out the boom, dipper stick and bucket as shown in Figure 9. Lower the bucket to the ground so that it rests there solidly.

3. Raise the backhoe operator's seat to the raised position.

4. Place suitable blocking under the backhoe frame to support it adequately as indicated in Figure 9.

5. Detach the backhoe from the tractor mechanically only, not hydraulically at this point. Move the tractor a few inches away from the backhoe.

Note: To facilitate this procedure, the backhoe can still be hydraulically moved, raised or lowered, to release the connection points of the carrying forces.

6. Gently lower the backhoe onto the blocking as indicated in Figure 9. Leave the stabilizers outstretched and firmly in contact with the ground for added stability.

7. The hydraulic system can now be disconnected.

⚠ CAUTION

Make sure tractor PTO is disengaged and engine shut off before disconnecting pump or hydraulic lines.

a. On PTO pump self-contained systems, the pump should be removed from the PTO shaft. The hydraulic system should always remain complete. No hoses or oil lines should be disconnected during correct removal and storage procedure.

b. On systems that tap into the tractor for hydraulic power, these lines can be disconnected now.

IMPORTANT: Be sure to mark the lines to prevent mix-up during hook-up when the hoe is again attached to the tractor.

Be sure to cap the ends of the lines to keep clean while in storage.

8. Now slowly drive the tractor forward and away from the backhoe. Be careful that all parts clear each other during separation.

9. Refer to the installation instructions for the attaching kit. This will help with the removal and reattaching.

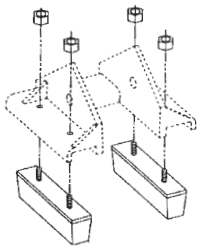
10. For long term storage, coat exposed lift, swing and stabilizer cylinder rods with grease.

11. Lubricate all grease fittings and oil all handle link-

STABILIZER PADS

The backhoe is supplied with flip-over stabilizer feet as standard equipment. They are suitable for most backhoe work and generally are all that is ever required. However, foot pad kits are available as options. These kits bolt to the standard feet and increase the versatility of the backhoe. See Figure 10.

Figure 10



Hydraulic Trouble Shooting

The trouble shooting material presented in this section is offered as a guide to diagnosing probable causes and remedies for general operational problems. Match your problem with the typical problem examples given, and note the possible cause and the proper corrective action.

NOTE: When using the following chart, if it is decided that an overhaul of components or pressure adjustments are necessary to correct malfunctioning, it is recommended that your dealer make these repairs. He is equipped to do this work.

⚠ WARNING

Escaping hydraulic / diesel fluid under pressure can penetrate the skin causing serious injury.

Do not use your hand to check for leaks. Use a piece of cardboard or wood to check for leaks.

Stop engine and relieve pressure before connecting or disconnecting lines.

If any liquid is injected into the skin, obtain medical attention immediately or gangrene may result.

TROUBLESHOOTING PROCEDURES

Problem	Cause	Correction
Machine fails to operate when started initially	Low oil supply in reservoir	Fill to proper level.
	No oil supply to machine	Oil is not being diverted from the prime mover hydraulic system. Be sure that the proper controls are actuated on the prime mover.
	Pump not running	Check pump drive to be sure it is engaged.
	Improper hose connection	**IMPORTANT: Be sure inlet and return hoses are hooked up correctly. Improper hook-up will result in damage to the backhoe valve.**
	Excessive back pressure	Relieve condition. Restriction may be from outlet to reservoir.
	Relief valve setting in backhoe control valve too low or defective	Relief pressure will have to be checked and corrections made. Backhoe system pressure is 2400 PSI. Relief valve may need cleaning and or overhauling or entire cartridge must be replaced.
Machine loses power after operating satisfactorily initially	Low oil supply in reservoir	Fill to proper level.
	Loose oil line connections, leaks in line or broken lines	Tighten all hose connections and replace any damaged O-rings at leaking O-ring fittings. Check and replace any damaged hoses and lines.
	Oil is bypassing cylinder piston, scored piston, worn piston packing, or defective piston assembly	Replace or rebuild the cylinder; replace damaged parts.

TROUBLESHOOTING (Continued)

Problem	Cause	Correction
Machine loses power after operating satisfactorily initially	Diverter valve on prime move leaking or bypassing oil internally through valve to reservoir	Diverter valve may need rebuilding or replacing.
	Excessive back pressure	Relieve condition. Restriction may be from outlet to reservoir.
	Relief valve setting in backhoe control valve too low or defective	Relief pressure will have to be checked and corrections made. Backhoe system pressure is 2400 PSI. Relief valve may need cleaning and over-hauling, or entire cartridge must be replaced.
Loss of power in lift or crowd cylinder, but other cylinders function properly	Spool not moved to full stroke	Check spool travel- should be .26" either way, or a total of .52".
	Overload relief valve in the control valve stuck open or malfunctioning	Clean relief carefully but do not disturb its pressure setting as it cannot be field calibrated, or replace cartridge.
	Problems involving the control valve	This valve is a precision device and is not intended for any extensive field adjustment or repair. Field replace-ment parts are limited to seal kits, cartridges, valve sections and tie rods. Replacement of these parts, the opening of check cavities and certain relief cavities to examine for trapped dirt, or resetting of the main relief valve with the use of good pressure gauge, should be referred to qualified service personnel. Dirt and shreds of packing material are the usual causes of valve malfunction. Be sure the reservoir oil supply is kept clean and only factory supplied packings are used in cylinder repair. Everything must be clean and free of dirt during oil line removal and replacement, and during any cylinder work.
Loss of power in any one cylinder, including lift and crowd	Loose oil line connections, leaks in line or broken lines	Tighten all hose connections and replace any damaged O-rings at leaking O-ring fittings. Check and replace any damaged hoses and lines.
	Restrictions in oil lines	Check and replace any damaged hoses and lines. Check for pinched hoses.
	Oil is bypassing cylinder piston, scored piston, worn piston packing, or defective piston assembly	Replace or rebuild the cylinder; replace damaged parts.
	Scored piston rods and worn guides in cylinder	Replace or rebuild the cylinder; replace damaged parts.
	Bent piston rod in cylinder	Replace or rebuild the cylinder; replace damaged parts.

Troubleshooting (Continued)

Problem	Cause	Correction
Loss of power in any one cylinder, including lift and crowd	Worn or damaged rod seals on cylinder; external leaks	Repack cylinder. Rebuild cylinder, replacing damaged parts as necessary.
	Spool not moved to full stroke	Check spool travel - should be .26" either way, or a total of .52".
	Overload relief valve in the control valve stuck open or malfunctioning	Clean relief carefully but do not disturb its pressure setting as it cannot be field calibrated, or replace cartridge.
	Worn control valve	Replace the control valve.
Loss of power in swing cylinders, but other cylinders functioning properly.	Loose oil line connections, leaks in line or broken lines	Tighten all hose connections and replace any damaged O-rings at leaking O-ring fittings. Check and replace any damaged hoses and lines.
	Restrictions in oil lines	Check and replace any damaged hoses and lines. Check for pinched hoses.
	Oil is bypassing cylinder piston, scored piston, worn piston packing, or defective piston assembly	Replace or rebuild the cylinder; replace damaged parts.
	Scored piston rods and worn guides in cylinder	Replace or rebuild the cylinder; replace damaged parts.
	Bent piston rod in cylinder	Replace or rebuild the cylinder; replace damaged parts.
	Worn or damaged rod seals on cylinder; external leaks	Repack cylinder. Rebuild cylinder, replacing damaged parts as necessary.
	Spool not moved to full stroke	Check spool travel - should be .26" either way, or a total of .52".
	Relief valve setting in backhoe control valve too low or defective	Relief pressure will have to be checked and corrections made. Backhoe system pressure is 2400 PSI. Relief valve may need cleaning and over hauling, or entire cartridge must be replaced.
	Worn control valve	Replace the control valve.
Maximum swing action cannot be obtained	Bent piston rod in cylinder	Replace or rebuild the cylinder; replace damaged parts.
	Something jamming the swing linkage	Remove interference.
Slow operation of machine (lack of power) all cylinders	Low oil supply in reservoir	Fill to proper level.
	Oil viscosity too heavy, or oil is not at operating temperature	Use recommended hydraulic fluid. Run machine until oil reaches operating temperature.
	Insufficient pumping	Advance engine throttle.
	Diverter valve on prime mover leaking externally or bypassing oil internally through valve to reservoir	Diverter valve may need rebuilding or replacing.
	Excessive back pressure	Relieve condition. Restriction may be from outlet to reservoir.

Troubleshooting (Continued)

Problem	Cause	Correction
Slow operation of machine (lack of power) all cylinders	Relief valve setting in backhoe control valve too low or defective	Relief pressure will have to be checked and corrections made. Backhoe system pressure is 2400 PSI. Relief valve may need cleaning and over-hauling, or entire cartridge must be replaced.
Spongy or jerking action of cylinders and/or noisy operation	Low oil supply in reservoir	Fill to proper level.
	Air in system	Bleed all circuits of air by operating machine at maximum oil flow and through full movements.
	Oil viscosity too heavy, or oil is not at operating temperature	Use recommended hydralic fluid. Run machine until oil reaches operating temperature.
	Pump not running	Check pump drive to be sure it is engaged.
Lift, crowd or bucket cylinders drop under load when control spools shifted from neutral	Damaged or worn spool seals	Replace spool end seals.
	Problems involving the control valve	This valve is a precision device and is not intended for any extensive field adjustment or repair. Field replace-ment parts are limited to seal kits, cartridges, valve sections and tie rods. Replacement of these parts, the opening of check cavities and certain relief cavities to examine for trapped dirt, or resetting of the main relief valve with the use of good pressure gauge, should be referred to qualified service personnel. Dirt and shreds of packing material are the usual causes of valve malfunction. Be sure the reservoir oil supply is kept clean and only factory supplied packings are used in cylinder repair. Everything must be clean and free of dirt during the oil line removal and replacement, and during any cylinder work.
Load drops or settles	Loose oil line connections, leaks in line or broken lines	Tighten all hose connections and replace any damaged O-rings at leaking O-ring fittings. Check and replace any damaged hoses and lines.
	Oil is bypassing cylinder piston, scored piston, worn piston packing, or defective piston assembly	Replace or rebuild the cylinder; replace damaged parts.
	Worn or damaged rod seals on cylinder; external leaks	Repack cylinder. Rebuild cylinder, replacing damaged parts as necessary.
	Worn control valve	Replace the control valve.
	Damaged or worn spool seals	Replace spool end seals.

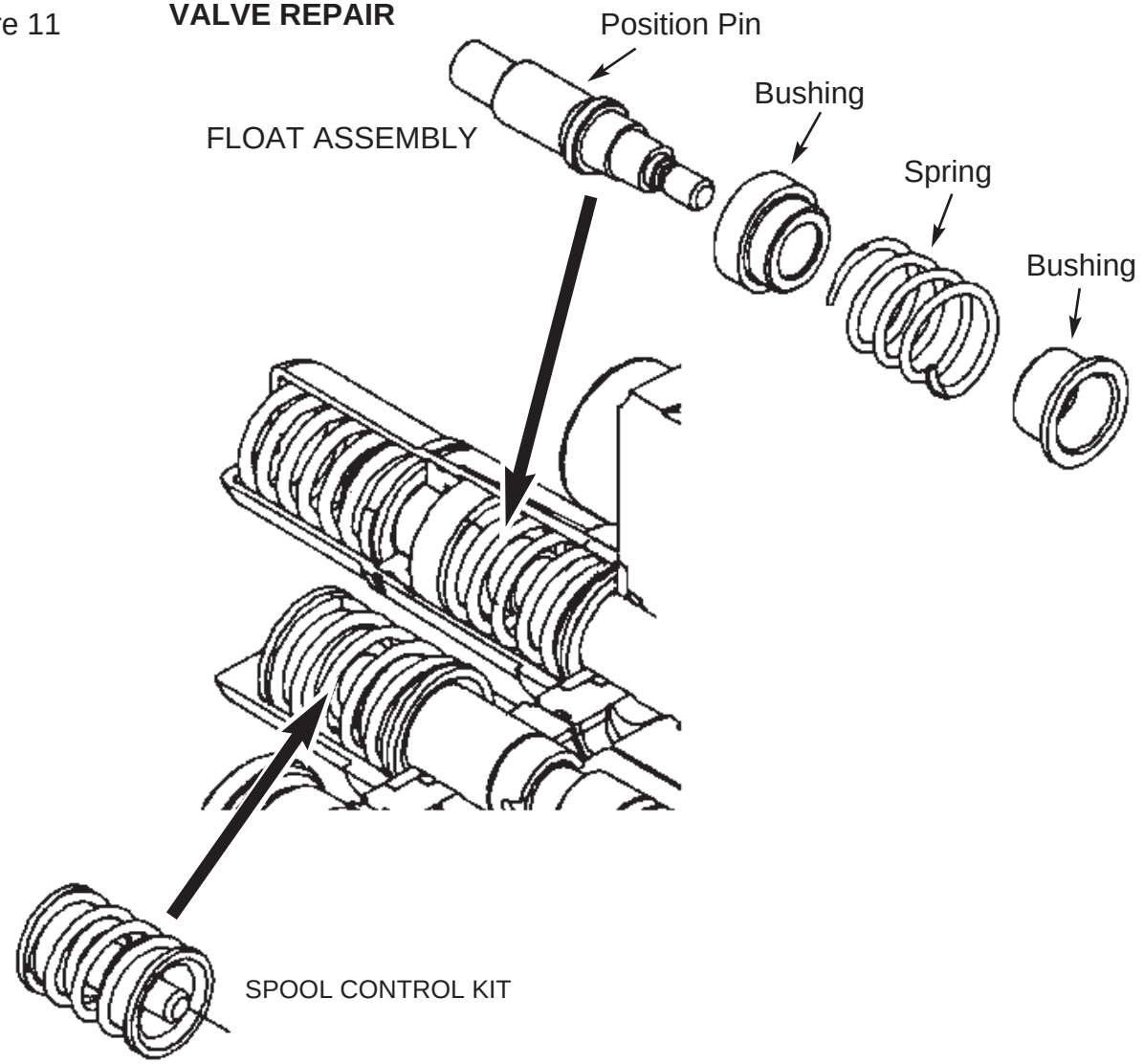
Troubleshooting (Continued)

Problem	Cause	Correction
Leaky cylinders	Oil is bypassing cylinder piston, scored piston, worn piston packing, or defective piston assembly	Replace or rebuild the cylinder; replace damaged parts.
	Scored piston rods and worn guides in cylinder	Replace or rebuild the cylinder; replace damaged parts.
	Bent piston rod in cylinder	Replace or rebuild the cylinder; replace damaged parts.
	Worn or damaged rod seals on cylinder; external leaks	Repack cylinder. Rebuild cylinder, replacing damaged parts as necessary.
Leaky valve	Loose oil line connections, leaks in line or broken lines	Tighten all hose connections and replace any damaged O-rings at leaking O-ring fittings. Check and replace any damaged hoses and lines.
	Excessive back pressure	Relieve condition. Restriction may be from outlet to reservoir.
	Paint on valve spool; sticking valve spool or scored valve spool valve body is leaking, do not overtighten	Clean valve spool. Binding is usually caused from an over tightened plug, mounting bolt, fitting in valve body or tie rod bolt. If a plug or fitting in the in an effort to stop leak. This will distort body casting and cause spools to bind. Instead, the plug and fitting should be removed from valve body and be reconnected, using a new O-ring. Do not apply excessive pressure on mounting bolts. The rods should be torqued to 30 ft. lbs. Never force spool.
	Ball in anti-cavitation check valve is stuck or not seating properly.	Clean anti-cavitation valve carefully, being sure that checks move freely and seat properly, or replace cartridge.
Sticky valve spool	Paint on valve spool; sticking valve spool or scored valve spool valve body is leaking, do not overtighten	Clean valve spool. Binding is usually caused from an over tightened plug, mounting bolt, fitting in valve body or tie rod bolt. If a plug or fitting in the in an effort to stop leak. This will distort body casting and cause spools to bind. Instead, the plug and fitting should be removed from valve body and be reconnected, using a new O-ring. Do not apply excessive pressure on mounting bolts. The rods should be torqued to 30 ft. lbs. Never force spool.
	Bent spool	Replace with new spool section.
	Foreign particles	Clean system and valve.
	Misalignment of control handle linkage	Check linkage for binding condition.

Troubleshooting (Continued)

Problem	Cause	Correction
Unable to push valve spool in	Paint on valve spool; sticking valve spool or scored valve spool	Clean valve spool. Binding is usually caused from an overtightened plug, mounting bolt, fitting in valve body or tie rod bolt. If a plug or fitting in the valve body is leaking, do not overtighten in an effort to stop leak. This will distort body casting and cause spools to bind. Instead, the plug and fitting should be removed from valve body and be reconnected, using a new O-ring. Do not apply excessive pressure on mounting bolts. The rods should be torqued to 30 ft. lbs. Never force spool.
	Oil leakage past spool seal into spool cap	Remove cap. If it contains oil replace spool seal O-rings. Check O-ring retainer to be sure it is flat. If it has been “belled” check for restriction from outlet to reservoir of valve which would cause excessive back pressure. If supply and return lines are reversed, pressure on low pressure / return side of valve will cause problem. Make sure hoses are connected correctly at bulkhead connection on backhoe.
	Bent spool	Replace with new spool section.
	Foreign particles	Clean system and valve.
	Misalignment of control handle linkage	Check linkage for binding condition.
Spring centered spools do not return to neutral	Paint on valve spool; sticking valve spool or scored valve spool	Clean valve spool. Binding is usually caused from an over tightened plug, mounting bolt, fitting in valve body or tie rod bolt. If a plug or fitting in the valve body is leaking, do not overtighten in an effort to stop leak. This will distort body casting and cause spools to bind. Instead, the plug and fitting should be removed from valve body and be reconnected, using a new O-ring. Do not apply excessive pressure on mounting bolts. The rods should be torqued to 30 ft. lbs. Never force spool.
	Oil leakage past spool seal into spool cap	Remove cap. If it contains oil replace spool seal O-rings. Check O-ring retainer to be sure it is flat. If it has been “belled” check for restriction from outlet to reservoir of valve which would cause excessive back pressure. If supply and return lines are reversed, pressure on low pressure / return side of valve will cause problem. Make sure hoses are connected correctly at bulkhead connection on backhoe.
	Broken return springs	Replace springs.
	Bent spool	Replace with new spool section.
	Foreign particles	Clean system and valve.
	Misalignment of control handle linkage	Check linkage for binding condition.

Figure 11 **VALVE REPAIR**



Replace Center Section Assemblies:

Note: For the purpose of these instructions we will consider the section containing the MAIN RELIEF VALVE as the left side of the valve.

1. Remove control valve from the backhoe.

2. Thoroughly clean the exterior of the valve before beginning disassembly procedures.

3. Since the valve will be assembled in the same order, each section should be marked numerically so that they can be reassembled in the same sequence.

4. Mount the valve vertically in a vise to facilitate disassembly and assembly.

5. Remove the 3 tie rod nuts from the right end section, using a thin-wall socket.

6. Valve sections can now be removed by sliding the sections along the tie rods.

7. Thoroughly clean the O-ring counterbores and the ground surfaces of each section. Place O-ring seals, ordered as a kit, in proper counterbores. For better sealing, it is recommended that all O-rings used in the counterbores be replaced with new parts.

8. Replace the sections on tie rods with the O-ring counterbores facing the right end of the valve. Be careful replacing the sections so that the section O-rings are not moved from the counterbores.

9. When all sections are assembled on the tie rods, tighten the tie rod nuts equally to 30 ft. lbs. torque, NO MORE - NO LESS, or spools may bind and stick.

Replacing Spool Seals:

Note: *For the purpose of these instructions we will consider the control handle side of the valve as the TOP, and the opposite side as the BOTTOM.*

3. Remove parts bag containing bucket pins from backhoe. Attach bucket (D) to dipperstick (B) using one pin, 3/8" bolt, and locknut.

4. Attach bucket link (E) to bucket, using same hardware as listed for step #3.

5. Reposition hoist on backhoe to prevent tipping and raise mainframe (G) slightly. Remove all remaining strapping and attach stabilizers (F) to mainframe (G) using pins and hardware from parts bag.

6. Attach stabilizer cylinders (H) to stabilizers (F) using pins and hardware from parts bag.

7. Using caution to prevent tipping, raise mainframe (G) with hoist to a height of approximately 17" and remove skid. Block mainframe (G) and swing frame (J) securely.

8. Follow the Attaching Kit Assembly Instructions to mount the backhoe to the tractor. Check the installation carefully and make sure that all members are correctly installed and securely fastened.

Assembly: (BH650 & BH750) - Figure 12

(See "General" note, page 24)

IMPORTANT: Tighten all hardware to torque requirements specified in torque chart on page 45.

⚠ CAUTION

DO NOT cut any strapping that fastens the backhoe mainframe and swing frame to the skid at this time.

1. Remove the stabilizer assemblies and any miscellaneous items which have been fastened to skid and arrange conveniently. Be sure hoses to stabilizer cylinders are routed above the cylinder-to-mainframe pivot pin connection.

2. Support boom (A) and dipperstick (B) with hoist attached at (C) and remove boom transport lock pin. Lower boom and extend dipperstick until end of dipperstick is approximately 16" above the ground. Move control handles to "BOOM DOWN" position and "CROWD OUT" position as required to aid movement.

⚠ CAUTION

Be sure hoist being used is suitable, has sufficient capacity, and is in the proper position. Do not allow anyone under a backhoe member supported by hoist.

3. Remove parts bag containing bucket pins from backhoe. Attach bucket (D) to dipperstick (B) using one pin, 3/8" bolt, and locknut.

4. Attach bucket link (E) to bucket, using same hardware as listed for step #3.

5. Reposition hoist on backhoe to prevent tipping and raise mainframe (G) slightly. Remove all remaining strapping and crate base. Using caution to prevent tipping, raise mainframe (G) to approximately 13" and block mainframe and swing frame (J) securely.

6. Attach stabilizers (F) to mainframe (G) using pins and hardware from parts bag.

7. Attach stabilizer cylinders (H) to stabilizers (F) using pins and hardware from parts bag.

8. Follow the Attaching Kit Assembly Instructions to mount the backhoe to the tractor. Check the installation carefully and make sure that all members are correctly installed and securely fastened.

MOUNTING KITS AND OPTIONAL KITS ASSEMBLY

3- POINT HITCH LINKAGE (For BH650 & BH750)

General Description

Mounting and hydraulic kits do not include hoses to connect the backhoe to the tractor hydraulic system. Additional hydraulic components, hoses, and/or kits will be required to complete the hook-up to the tractor hydraulic system. Refer to the "Hydraulic Hook-up" section for further information. PTO pump kits are available as options.

Mounting Backhoe to Tractor or Skid Steer loaders

The Bush Hog backhoe can be mounted to the power source using three different attaching kits.

1. To an agricultural tractor's 3-point hitch linkage using the 3-point hitch kit. The 3-point hitch kit is the same regardless of tractor model and the instructions for attaching the kit to the backhoe are included below. See Figure 13 for general appearance.

2. To an agricultural tractor using a subframe kit specifically offered for the tractor model and backhoe being mounted: The subframe kit instructions differ with each tractor/backhoe combination and come included with the individual subframe kit.

3. To a skid steer loader using a skid steer adaptor kit offered for the skid steer model and backhoe series being mounted. The skid steer adapter kit instructions differ with each skid steer model/backhoe combination and come included with the individual skid steer adapter kit.

3-Point Hitch Linkage BH650 & BH750

The backhoe is mounted on the tractor lower link arms and an adjustable upper link is supplied to replace the tractor upper link. A set of stabilizer arms is included. They bolt from the adjustable upper link to the backhoe mainframe, locking the hoe rigidly in one position.

IMPORTANT: Tractor lower links must be kept free of lifting forces at all times after installation of the attaching kit by keeping tractor quadrant lever in the lowered position.

NOTE: *If the 3-Point Kit is to be used with a PTO Pump Kit, the Reservoir Tank and its fittings should be installed before proceeding with the 3-Point Kit installation.*

Figure 13 Ag Tractor using 3-point hitch

ASSEMBLY (Refer to Figures 14 & 15)

IMPORTANT: Tighten all hardware to the torque requirements specified in the torque chart.

⚠ WARNING

To prevent bodily injury, do not operate backhoe unless Link Weldments (Figure 15 - Items 1 & 2) are properly installed and adjusted. Failure to do so may result in backhoe being thrust upward, crushing operator against cab or ROPS.

1. Use hoist to raise the backhoe mainframe so that the boom pivot pin is aproximately 13" off the ground.

2. Back tractor close to the backhoe. Connect tractor lower link arms to lower link mounts at position "C", Figure 14, using two L-pins (3), two cotter pins (4), and two wire form cotter pins (5) as shown in Figure 15.

NOTE: *If tractor has a Category II hitch, install two bushings (6) in lower link arms as shown in Figure 15.*

3. Attach upper braces (7), Figure 15, to backhoe with 3/4 x 7-1/2" bolt (8), flat washers (9), lockwasher (10) and nut (11). Do not tighten hardware at this time.

4. Install bushing (12) or bushing (13) that most closely matches the diameter of the tractor upper link pin in the hole of the upper bar (14), as shown in Figure 15. No bushing is necessary for Category II tractors.

5. Secure upper bar (14) between upper braces (7) using 3/4 x 4-1/2" bolt (15), flat washers (9), lockwasher (10) and nut (11). Use hoist to raise or lower backhoe slightly until a hole in the upper bar aligns with a hole in the upper braces. See Figure 14.

6. Attach RH lower link weldment (1) and LH lower link weldment (2) to backhoe mainframe using 7/8" x 2-1/2" bolt (16), flat washers (17), lockwasher (18), and nut (19). See Figure 15.

7. Align RH and LH link weldment (1, 2) with a hole in the upper bar/brace assembly, as close to the tractor as possible. Use 3/4 x 6" bolt (20), flat washers (9), lockwasher (10), and nut (11). See Figure 15. You may need to return to Step 6 and reajust the bolt connection upward or downward .

8. Remove backhoe from the tractor.

9. Install connector bar (21) to RH and LH lower link weldments (1, 2) using 1/2 x 1-1/2" bolt (22), lockwasher (23), and nut (24). See Figure 15.

10. Tighten all hardware at this time. Check your installation very carefully to be sure all members are correctly installed and securely fastened.

11. If using optional PTO Pump Kit, proceed to that section prior to mounting the backhoe onto the tractor.

12. Connect hoses from the backhoe control valve to the tractor hydraulic system as described in "Hydraulic Hook-Up" section, prior to mounting the backhoe onto the tractor.

Figure 14

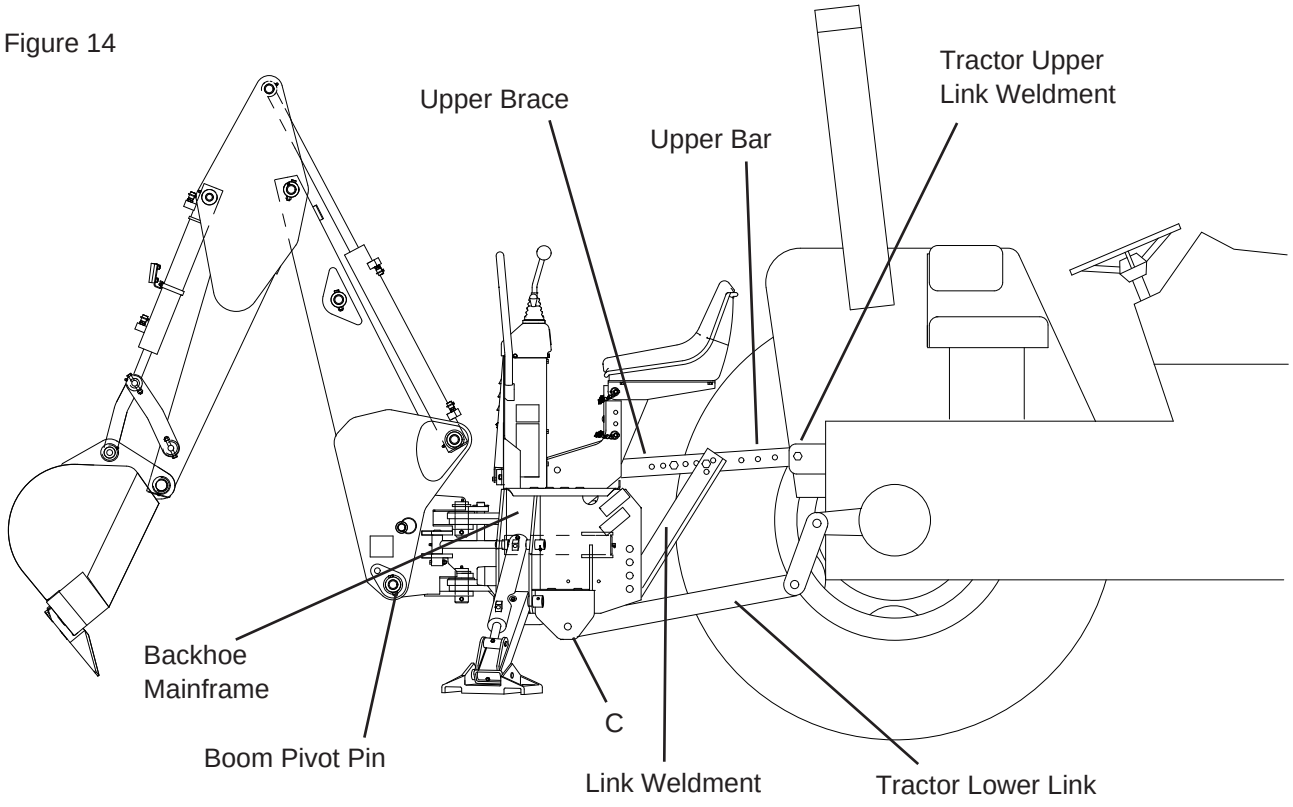
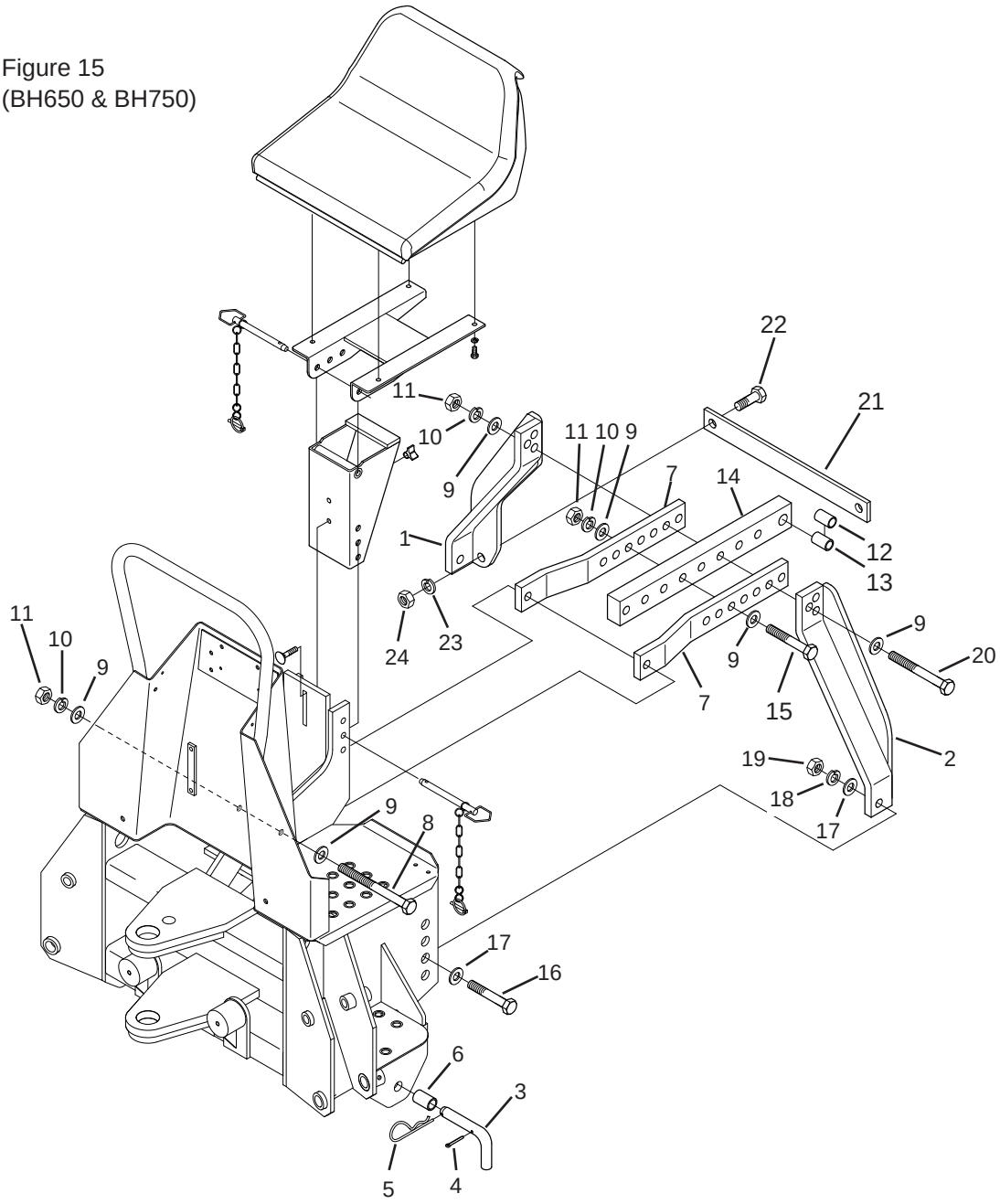


Figure 15
(BH650 & BH750)



BH850/BH950
3-POINT HITCH LINKAGE

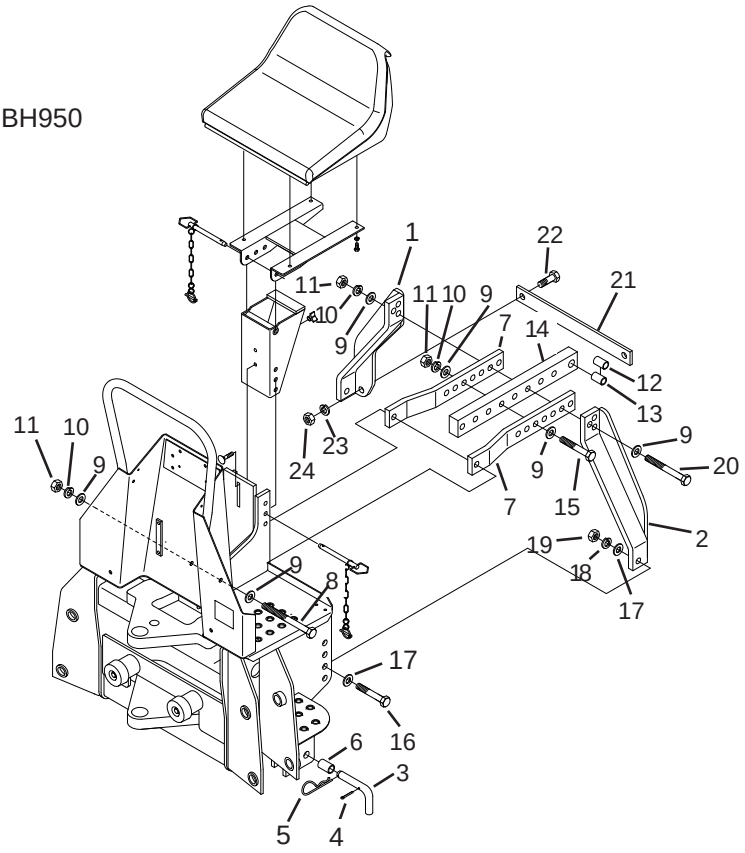
3-Point Hitch Linkage

The backhoe is mounted on the tractor lower link arms and an adjustable upper link is supplied to replace the tractor upper link. A set of stabilizer arms are included. They bolt from the adjustable upper link to the backhoe mainframe, locking the hoe rigidly in one position.

IMPORTANT- Tractor lower links must be kept free of lifting forces at all times after installation of the attaching kit by keeping tractor quadrant lever in the lowered position.

NOTE: *If the 3-Point Kit is to be used with a PTO Pump Kit, the Reservoir Tank and it's fittings should be installed before proceeding with the 3-Point Kit installation.*

Figure 16
(BH850 & BH950



ASSEMBLY

IMPORTANT: Tighten all hardware to the torque requirements specified in the torque chart on page 45.

⚠ WARNING

To prevent bodily injury, do not operate backhoe unless Link Weldments (Figure 16 - Items 1 & 2) are properly installed and adjusted. Failure to do so may result in backhoe being thrust upward, crushing operator against cab or ROPS.

1. Use hoist to raise the backhoe mainframe so that the boom pivot pin is approximately 17" off the ground.

2. Back tractor close to the backhoe. Connect tractor lower link arms to lower link mounts at position "C", Figure 17, using two L-pins (3), two cotter pins (4), and two wire form cotter pins (5) as shown in Figure 16.

NOTE: *If tractor has a Category II hitch, install two bushings (6) in lower link arms as shown in Figure 16.*

3. Attach upper braces (7), Figure 16, to backhoe with 3/4 x 7-1/2" bolt (8), flat washers (9), lockwasher (10) and nut (11). Do not tighten hardware at this time.

4. Install bushing (12) or bushing (13) that most closely matches the diameter of the tractor upper link pin in the hole of the upper bar (14), as shown in Figure 16. No bushing is necessary for Category II tractors.

5. Secure upper bar (14) between upper braces (7) using 3/4 x 4-1/2" bolt (15), flat washers (9), lockwasher (10) and nut (11). Use hoist to raise or lower backhoe slightly until a hole in the upper bar aligns with a hole in the upper braces. See Figure 16.

6. Attach RH lower link weldment (1) and LH lower link weldment (2) to backhoe mainframe using 7/8" x 2-1/2" bolt (16), flat washers (17), lockwasher (18), and nut (19). See Figure 16.

7. Align RH and LH link weldment (1, 2) with a hole in the upper bar/brace assembly, as close to the tractor as possible. Use 3/4 x 6" bolt (20), flat washers (9), lockwasher (10), and nut (11). See Figure 16. You may need to return to Step 6 and readjust the bolt connection upward or downward .

8. Remove backhoe from the tractor.

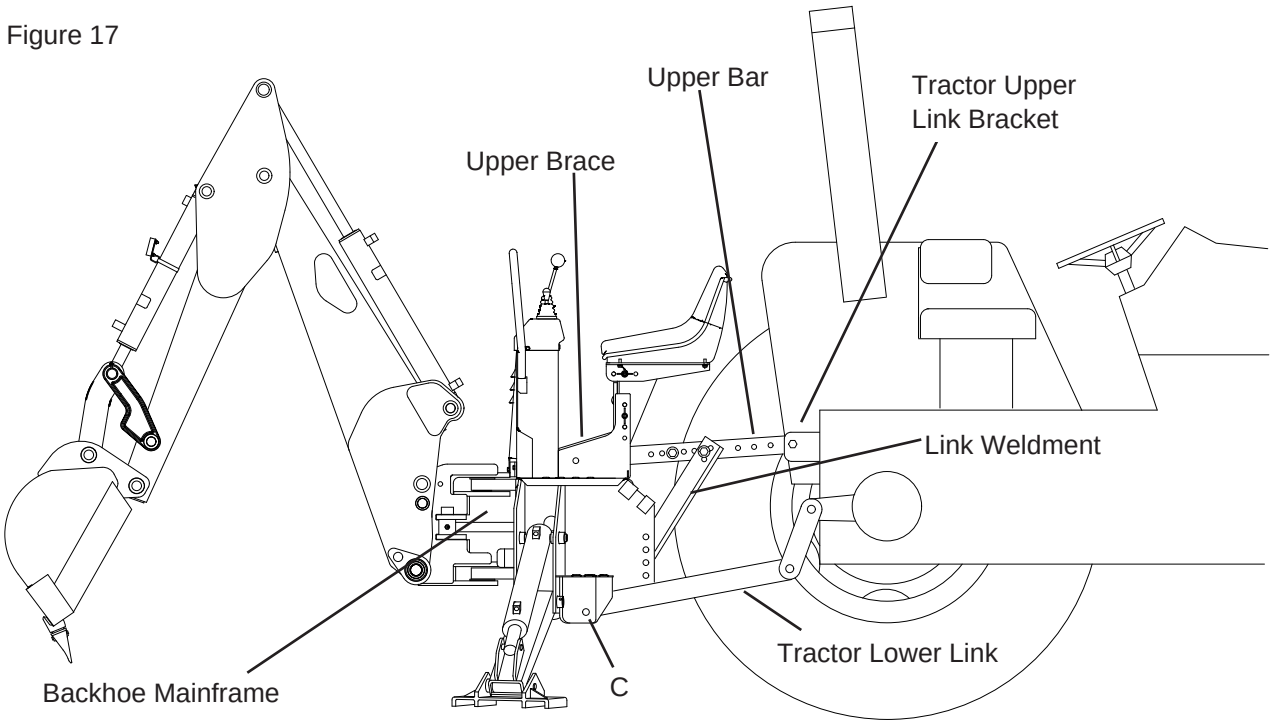
9. Install connector bar (21) to RH and LH lower link weldments (1, 2) using 1/2 x 1-1/2" bolt (22), lockwasher (23), and nut (24). See Figure 16.

10. Tighten all hardware at this time. Check your installation very carefully to be sure all members are correctly installed and securely fastened.

11. If using optional PTO Pump Kit, proceed to that section prior to mounting the backhoe onto the tractor.

12. Connect hoses from the backhoe control valve to the tractor hydraulic system as described in "Hydraulic Hook-Up" section, prior to mounting the backhoe onto the tractor.

Figure 17



PTO PUMP KITS (Optional)

General Description

The PTO Pump Kits consist of those parts required to power the backhoe from the tractor's PTO shaft. They include the PTO pump (6 or 8 gpm) and adapter, reservoir, filtration system, hydraulic hoses, and fittings. In addition, they include a torque plate that straddles the tractor's draw bar and keeps the pump from turning with the PTO shaft.

NOTE - *The speed of backhoe operations increases as PTO speed increases.*

ASSEMBLY

IMPORTANT - When installing fittings, always use a paste-type thread sealant on perrmanent connections such as NPT (pipe) threads. DO NOT use Teflon tape as thread sealant. DO NOT use thread sealant on union ends of adapters. DO NOT over-tighten fittings - they can split or expand causing hydraulic fluid leakage.

Please refer to Figure 18 as a guide for assembly of the PTO Pump Kits.

1. Assemble reservoir (16) to backhoe using 3/8" x 1" bolts (2), flat washers (5), lock washers (7), and hex nuts (10).

2. Assemble 1" street elbow (34) to fill port on top of reservoir, orienting elbow so that it faces right rear of backhoe. Connect fill tube (17) to street elbow. Elbow may have to be rotated slightly to allow fill tube to be installed so that its open end is located just behind foot platform to right of operator's seat tower. Install breather cap with dipstick (18) onto fill tube.

3. If filter element (35) is not already attached to filter base, apply a thin layer of hydraulic fluid to the rubber seal on the filter element and then screw it onto the filter base. Hand tighten the element until it just seats on the filter base, then tighten an additional 3/4 of a turn. Use this same procedure when replacing filter element.

NOTE - *Change filter element every time oil is changed.*

4. Assemble 90° adapter fitting (27) to inlet port of filter base and orient so that free end of fitting will point towards backhoe and angled slightly downward from horizontal. Assemble small 90° beaded tube fitting (26) to outlet port of filter base and orient so that free end of fitting will point towards backhoe and angled about 30° upward from horizontal. Connect filter assembly (15) to left rear corner of backhoe foot platform using 1/4" x 3/4" bolts (1), flat washers (4), and lock washers (6) - flow direction arrow on filter base should point toward rear of backhoe. **DO NOT** over-tighten bolts as this will strip the threads on filter base.

5. Assemble on 90° JIC adapter fitting (28) to "Out/Return" port of bulkhead connection and an

identical fitting to “In/Pressure” port of bulkhead connection. Orient fittings so that free ends of fittings point horizontally toward center of backhoe.

6. Take one end of 28” hydraulic hose (23) and route under foot platform, through hole at top of left hand backhoe side plate, and connect to 90° adapter fitting (27) at inlet of filter base. Connect free end of hose to 90° JIC adapter fitting (28) on “Out/Return” port of bulkhead connection.

7. Assemble small 90° beaded tube fitting (26) to inlet port at left rear of hydraulic reservoir and connect 24” return hose (21) from this fitting to 90° beaded tube fitting (26) on filter base. Secure hose to fittings at either end using two small hose clamps (32).

8. Assemble torque plate (33) to PTO pump (12) using 1/2” x 1-1/2” bolts (3), lock washers (8), and hex nuts (11). Torque plate may need to be re-oriented later to accommodate different tracator configurations.

9. Align key slot in PTO adapter (13) with Woodruff key on PTO pump shaft and slide PTO adapter onto pump shaft allowing 1/8” clearance between adapater and pump face. Secure PTO adapter to pump shaft with two 5/16” x 3/4” set screws (14). Place 5/16” hex nuts (9) on set screws and tighten nuts to prevent set screws from loosening.

10. Assemble large 90° beaded tube fitting (24) to outlet port at right rear of hydraulic reservoir and orient free end of fitting horizontally pointing toward left side of backhoe.

11. Assemble large 0-ring boss adapater (30) to “IN” port on PTO pump, tightening fitting until it completely bottoms-out on pump. Connect 90° beaded tube fitting (25) to 0-ring adapter. Beaded tube fitting may need to be reoriented later for proper hose routing.

12. Connect 30” suction hose (19) between 90° beaded tube fittings (24, 25) on hydraulic reservoir and PTO pump and secure hose to fittings at either end with large hose clamps (20).

13. Assemble small 0-ring boss adapter (31) to “OUT” port on PTO pump tightening fitting until it completely bottoms-out on pump. Connect 90° JIC adapter (29) to 0-ring adapter. JIC adapter may need to be reoriented later for proper hose routing.

14. Connect 36” hydraulic hose (22) between 90° JIC adapters (29, 28) on PTO pump and “In/Pressure” port on bulkhead connection.

IMPORTANT - If hoses are hooked-up incorrectly, serious damage to the backhoe will result.

15. **NOTE: Initial filling of backhoe reservoir requires 7 gallons of fluid.** Fill reservoir with recommended fluid to correct level, referring to Service Section in Backhoe Operator’s Manual. **DO NOT** overfill reservoir or oil may be forced out through breather cap during backhoe operation.

16. Mount backhoe to tractor at this time following procedure in Attaching Kit Manual.

17. Slide complete PTO pump assembly onto tractor PTO shaft until PTO adapter (13) locks into groove on PTO shaft. Make sure kinks do not develop in any hydraulic lines. Suction hose (19) can be shortened to help prevent kinks. Adjust orientation of 90° adapter fittings (25, 29) on PTO pump (12) as required to remove kinks or sharp bends in hoses.

⚠ CAUTION

DO NOT REMOVE TRACTOR PTO GUARD

18. Torque plate (33) may be adjusted (flipped front-to-back or bottom-to-top) on pump for proper fit-up to tractor drawbar or 3-Point Hitch Kit, if necessary. Optimum position is to mount plate pointing down and over drawbar with offset in torque plate facing towards tractor. (Refer to Figure 18)

An alternate position for torque plate is to mount it pointing upward straddling upper bar of 3-Point Hitch Kit. Regardless of which mounting position is used with torque plate, PTO pump must be restrained from rotating.

IMPORTANT- When mounting backhoe with 3-Point Hitch Kit, do not let hydraulic lines become entangled in any part of Hitch Kit during installation. Ensure that both pressure and suction hoses are free from kinks or twists to reduce back pressure and to prevent excessive heat build-up.

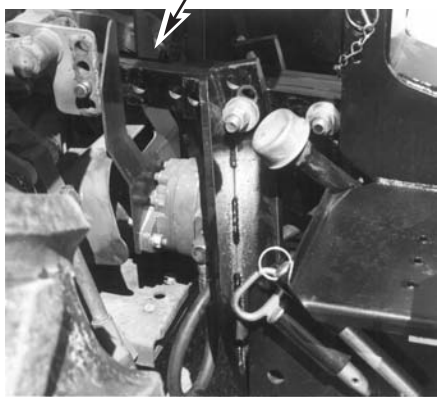
19. Start tractor engine and engage tractor PTO. Cycle backhoe through all of its functions several times to remove air from cylinders and hydraulic lines until all functions operate smoothly. After cycling all backhoe functions, check oil level with backhoe extended to full reach and bucket rolled-back and resting on ground. If oil level on dipstick is below “ADD” line, add oil to bring oil level up to “FULL” line. **DO NOT** overfill reservoir or oil may be forced out through breather cap during backhoe operation.

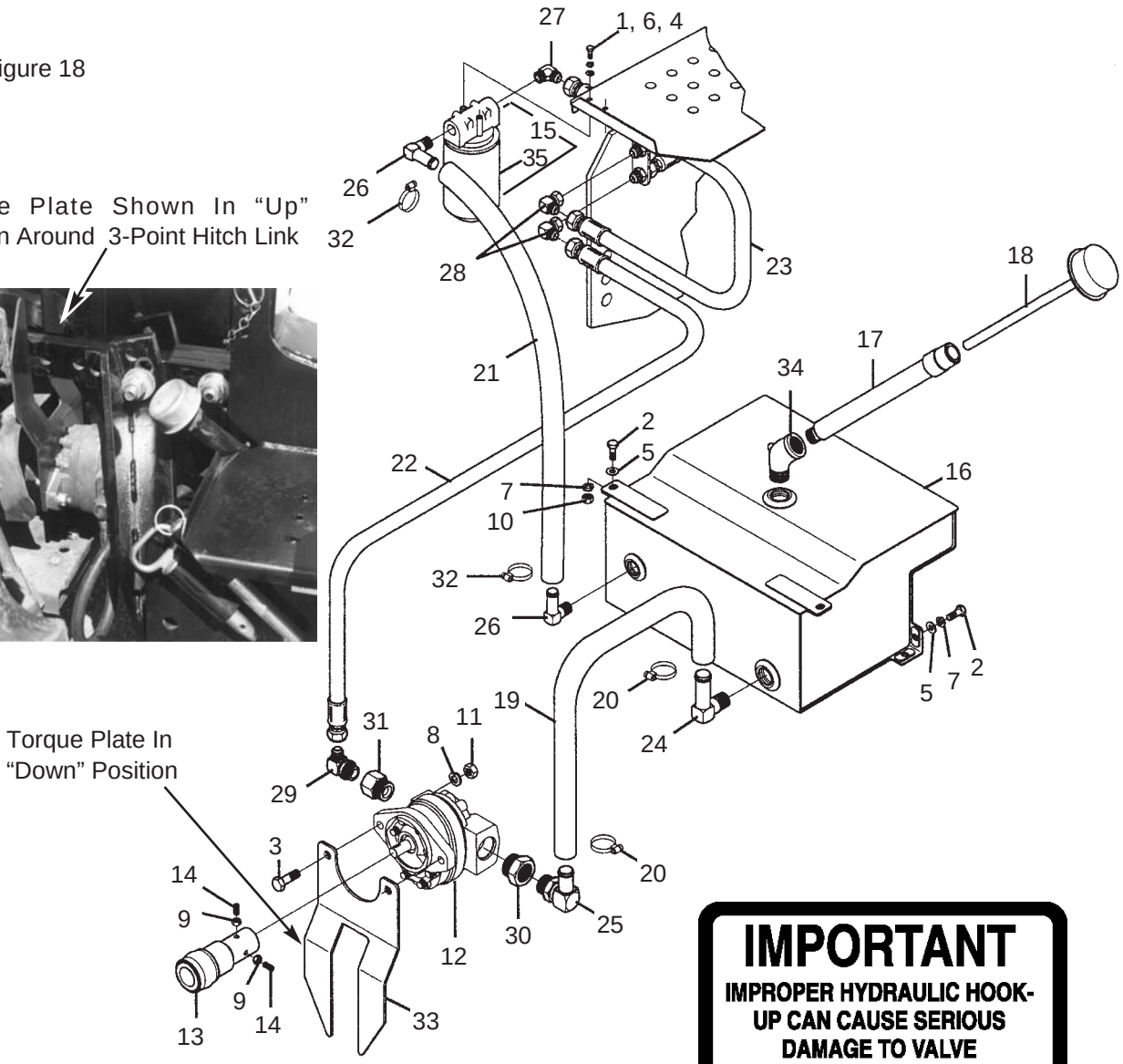
HYDRAULIC HOOK-UP TO TRACTOR

If the optional PTO Pump Kit is to be used, refer to the instructions for that kit for proper assembly.

There are four basic methods of hooking up the backhoe to the hydraulic system of a tractor. The correct method for the particular tractor will depend on the remote couplers available, whether a loader

Figure 18





valve or other accessory valve is connected to the tractor system, and whether the tractor has an open-center system (constant pumping of oil to control valve and back to reservoir) or a closed-center system (no flow of oil until there is a demand at one hydraulic cylinder). The four hook-up methods are described below.

IMPORTANT: Follow instructions carefully when connecting backhoe to tractor hydraulic system.

The decal shown at right is located on the front left hand side of the control console.

NOTE: *Do not connect hoses from the backhoe control valve to the tractor hydraulic system until initial assembly of mounting kit is complete.*

1. OPEN-CENTER SYSTEM WITH LOADER VALVE OR OTHER ACCESSORY VALVE CONNECTED TO THE TRACTOR HYDRAULIC SYSTEM

IMPORTANT

IMPROPER HYDRAULIC HOOK-UP CAN CAUSE SERIOUS DAMAGE TO VALVE

- **REFER TO ATTACHING KIT OR PTO PUMP KIT MANUAL FOR PROPER HYDRAULIC HOOK-UP.**
- **NEVER PRESSURIZE RETURN PORT OF VALVE OR RESTRICT RETURN HOSE.**
- **ALWAYS MOVE TRACTOR 3-POINT HITCH CONTROL TO FULLY LOWERED POSITION WHILE BACKHOE IS MOUNTED TO TRACTOR.**

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When a loader valve or other accessory valve must be connected to the tractor hydraulic system in addition to the backhoe control valve, a Power Beyond Kit is required. This kit converts the backhoe valve so that pressurized hydraulic oil can be directed to another open-center valve for a loader or other accessory. This allows the backhoe valve and the other valve to be connected to the tractor hydraulic system simultaneously, without the inconvenience of using a flow diverting valve.

Since the Power Beyond Kit is used with open-center tractor hydraulic systems, oil constantly flows from the pump, through the backhoe valve and the loader valve or other accessory valve, and then to the reservoir. See further in this manual for instructions on proper assembly.

2. **CLOSED CENTER SYSTEM: (BH650)**

Because a closed-center system requires no flow of oil through the backhoe control valve when the levers are in a neutral position, the **BH650 backhoe must not be connected to a closed-center tractor hydraulic system. A PTO pump kit is required if the backhoe is to be mounted to a tractor with a closed-center hydraulic system.**

IMPORTANT: Do not connect a BH650 backhoe control valve to a closed-center tractor hydraulic system, or serious damage to backhoe valve or tractor hydraulic system may result.

3. OPEN-CENTER SYSTEM WITH RETURN OIL NOT REQUIRED FOR LUBRICATION - Figure 19

The pressure hose (A) should be connected from the pressure port at the backhoe bulkhead connection to the pressure port of the tractor remote couplers or directly to the tractor valve. The return hose (B) should be connected from the tank (return) port at the backhoe bulkhead connection directly to a port on the reservoir, as shown in Figure 19.

IMPORTANT: Never connect the return hose to a tractor remote coupler which can be pressurized. Accidental pressurization can cause serious damage to backhoe valve.

4. OPEN-CENTER SYSTEM WITH RETURN OIL REQUIRED FOR LUBRICATION - Figure 20

On some tractors, the return oil cannot be routed directly to the reservoir because it is required for the lubrication of other functions. Check this characteristic with your dealer. The pressure hose (A) must be connected from the pressure port at the backhoe bulkhead connection to the pressure port of the tractor's remote couplers or directly to the tractor valve. The return hose (B) must be connected from the tank (return) port at the backhoe bulkhead connection to a surge relief valve as shown in Figure 20.

NOTE: *The surge relief valve is not supplied with the backhoe or mounting kit and must be ordered separately to complete this type hydraulic hook-up.*

Complete the hydraulic hook-up by connecting the surge relief valve to the return port of tractor remote couplers or directly to the tractor valve, and by connecting a hose from TANK port of the surge relief valve to the tractor reservoir as shown in Figure 20. The surge relief valve is used to protect the backhoe valve from damage caused by accidental pressurization or high back pressure build-up. If this happens, oil will be vented from the TANK port of the surge relief valve to the tractor reservoir to prevent loss of vented oil.

Figure 19

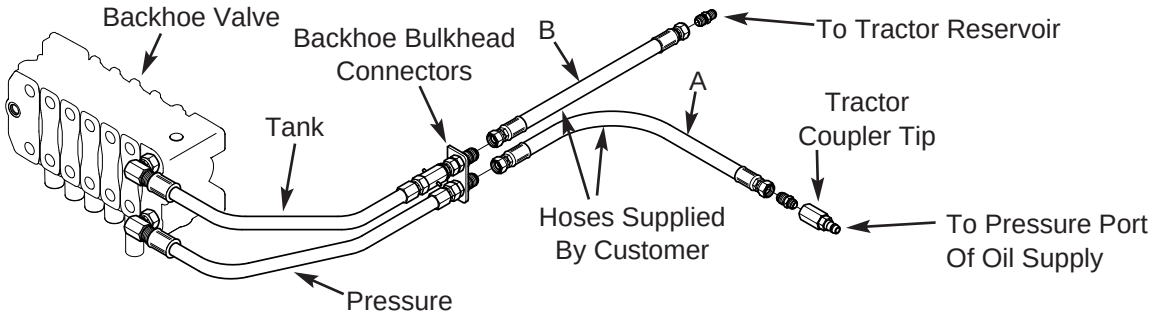
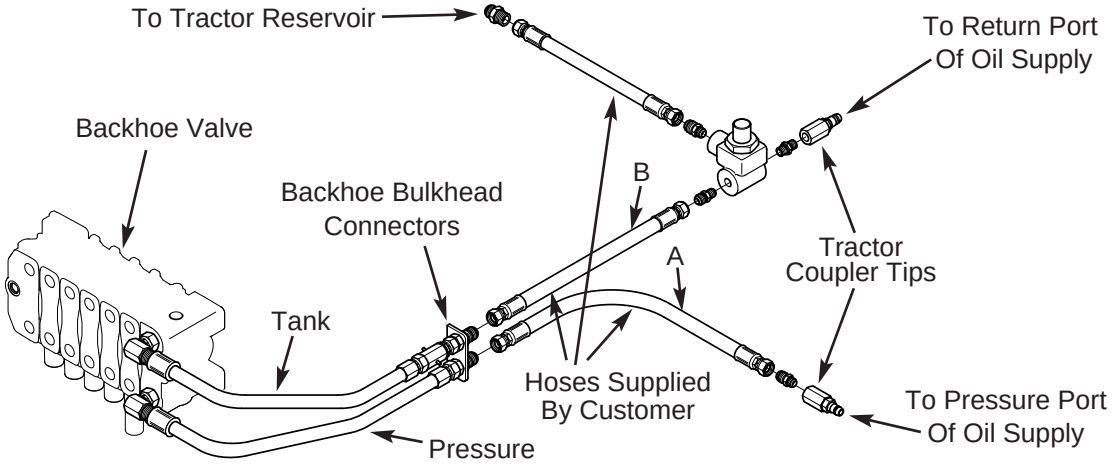


Figure 20



Hydraulic Hook-Up (BH750, BH850, BH950)

For Tractors With Closed-Center Hydraulic Systems (Figure 21)

There are two basic types of hydraulic systems, open-center and closed-center. The open-center system constantly pumps oil through the hydraulic cylinder operating valves and returns the oil to the reservoir. The closed-center system does not pump oil until there is a demand for oil from one of the hydraulic cylinders.

In this case, CLOSED-CENTER means that when the operating valves which control the hydraulic cylinders are in the neutral position, there is no flow of oil through the valves. As long as the engine and pump are running, a constant stand-by oil pressure of approximately 2000 PSI or more is maintained in the system. Pressure oil is available instantaneously to go to work when any one of the operating valves is opened.

Because there must be no flow through the backhoe control valve when the levers are in neutral position, the backhoe must be converted for closed-center operation.

Hook-Up Requirements

The hook-up of the BH750, BH850, & BH950 Backhoes to the closed-center system requires more than connecting it to the remote couplers. The required devices are:

1. A flow restrictor in the pressure line to keep the speed of the backhoe operation within safe and acceptable limits.

2. A main relief valve in the backhoe control valve with a pressure setting that is always higher than the tractor system pressure.

3. A closed-center plug in the backhoe control valve to make it a non-circulating or a demand type system.

4. **A low pressure surge relief valve in the return line to keep the tractor back pressure surges from damaging the backhoe control valve seals or tractor system.** A surplus flow line from the relief valve carries only the excess surge oil directly back to the tractor hydraulic reservoir so that it bypasses all other tractor functions.

Backhoe Operation

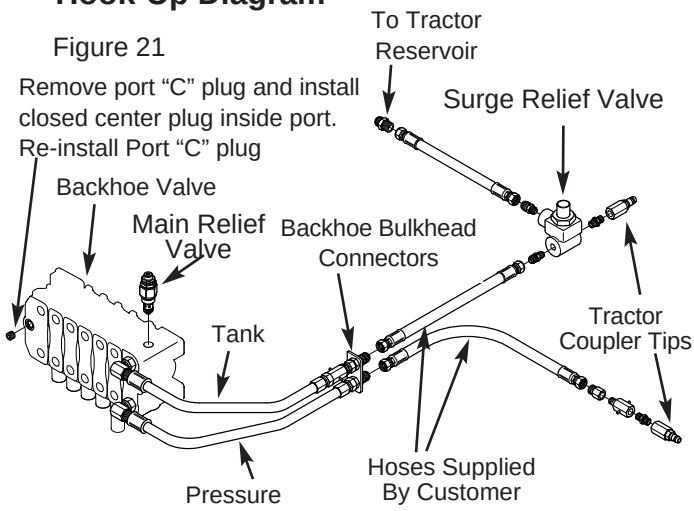
For the most part, a backhoe will function about the same whether it is powered by an open-center or closed-center hydraulic system. However, there are some differences which the operator should be aware of when utilizing a closed-center hydraulic system.

As a backhoe function (lifting, actuating the bucket to fill it, etc.) becomes increasingly difficult and the hydraulic system pressure is rising closer to its maximum setting, there will be a noticeable slow down before stoppage occurs. As the system pressure is approaching maximum, the pump is also beginning to stroke back for less and less fluid delivery. At maximum pressure, the pump is completely destroked and there is no delivery.

Therefore, when working various backhoe functions at or near maximum ability, a closed center system will give the operator the impression that the backhoe is sluggish and somewhat unresponsive. Learning to ease up slightly at the first indication of slow down will permit the backhoe to perform at continuing maximum speed and efficiency.

Hook-Up Diagram

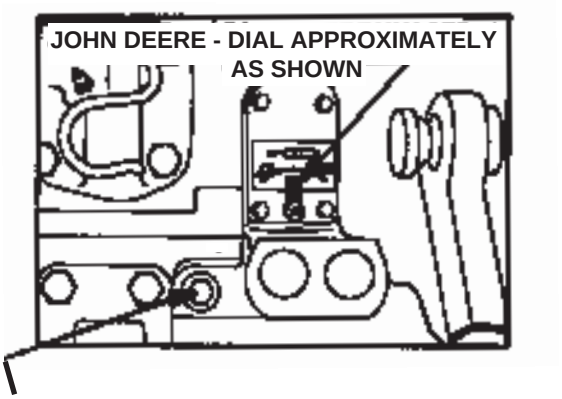
Figure 21



For John Deere Tractors use reservoir plug. Remove plug, drill with 37/64 drill, and tap 3/8 NPT pipe. Screw adapter into plug, locking with Locktite to assure assembly will remain together during connecting and disconnecting procedures. Obtain another plug from your dealer to use when backhoe is removed.

For other tractor makes, use filler plug, drain plug, or any other port that goes directly into the hydraulic reservoir. Do not rely only on the remote coupler return.

Figure 22



Typical plug for surplus relief flow line. Check carefully that it enters the reservoir before using. Note that the location varies with different tractor makes and models. A John Deere Tractor is shown.

POWER BEYOND KITS
FOR TRACTORS WITH OPEN-CENTER HYDRAULIC SYSTEMS

General Description

A power beyond application is required to convert a hydraulic valve so that pressurized oil can be directed to another "open center" valve. This allows the backhoe valve and a loader valve, or other accessory, to be connected to the tractor hydraulic system simultaneously, without the inconvenience of using a flow diverting valve.

Since the power beyond application is only required on "open center" hydraulic systems, oil will be constantly flowing from the pump through the backhoe and loader or other accessory valve, and then back to the reservoir. "Open center" refers to this constant flow through the open center of the valves.

The assembly instructions cover two conditions that require a power beyond kit to be ordered from Bush Hog. The first procedure shows the recommended method of connecting a Bush Hog loader with a Bush Hog valve to a Bush Hog backhoe. The second procedure shows the recommended method for connecting a Bush Hog backhoe and a competitive loader or a non Bush Hog valve. The second is also used to operate the backhoe and loader off the backhoe PTO pump kit option. In the first procedure, the power beyond plug is included with the loader valve when the valve is ordered. The second procedure requires the power beyond kit for the backhoe valve be ordered from Bush Hog as a separate item.

The hoses and fittings required in either procedure to connect the two valves together are not supplied. The proper fittings and hose lengths required must be determined for each specific application. The parts must be supplied by the customer.

Tractor Preparation

Stop tractor, lower all attachments to the ground, and relieve pressure in all hydraulic lines by moving all control handles back and forth or side to side several times.

Note: The terms RIGHT and LEFT for all adapter parts are determined from the position of the operator when seated in the operating position on the backhoe.

FIRST PROCEDURE

ASSEMBLY OF A BUSH HOG BACKHOE TO A BUSH HOG LOADER VALVE

IMPORTANT: Improper hydraulic hook-up can cause serious damage to backhoe control valve or other hydraulic components. Refer to the Bush Hog loader Operator's Manual during this procedure.

When connecting the Bush Hog backhoe valve to a Bush Hog front end loader valve, the input pressure line from the tractor will be connected to the loader valve first. The power beyond pressure line will be connected to the input pressure port of the backhoe valve. In order to properly plumb the system, the loader valve will require converting to a power beyond valve. Refer to the Operator's Manual received with the loader for the proper assembly of the power beyond valve.

There have been several different valves used on the Bush Hog loader in past years. The fittings required to convert the Bush Hog loader valve to a power beyond application are included in the loader valve kit. If the fittings (or plugs) cannot be located, they can be obtained from Bush Hog Service Parts. Before attempting to order the plug you must first determine the manufacturer of the loader valve assembled to your loader. This can be determined from the identification plate located on the valve.

1. Install the power beyond plug received with the loader valve into valve cavity as shown in Figure 23 (Page 36). Make sure O-rings on sleeve are positioned properly and are not pinched or damaged.

2. Install a pressure line (supplied by customer) between the tractor pressure "out" port and the pressure inlet port of the loader valve.

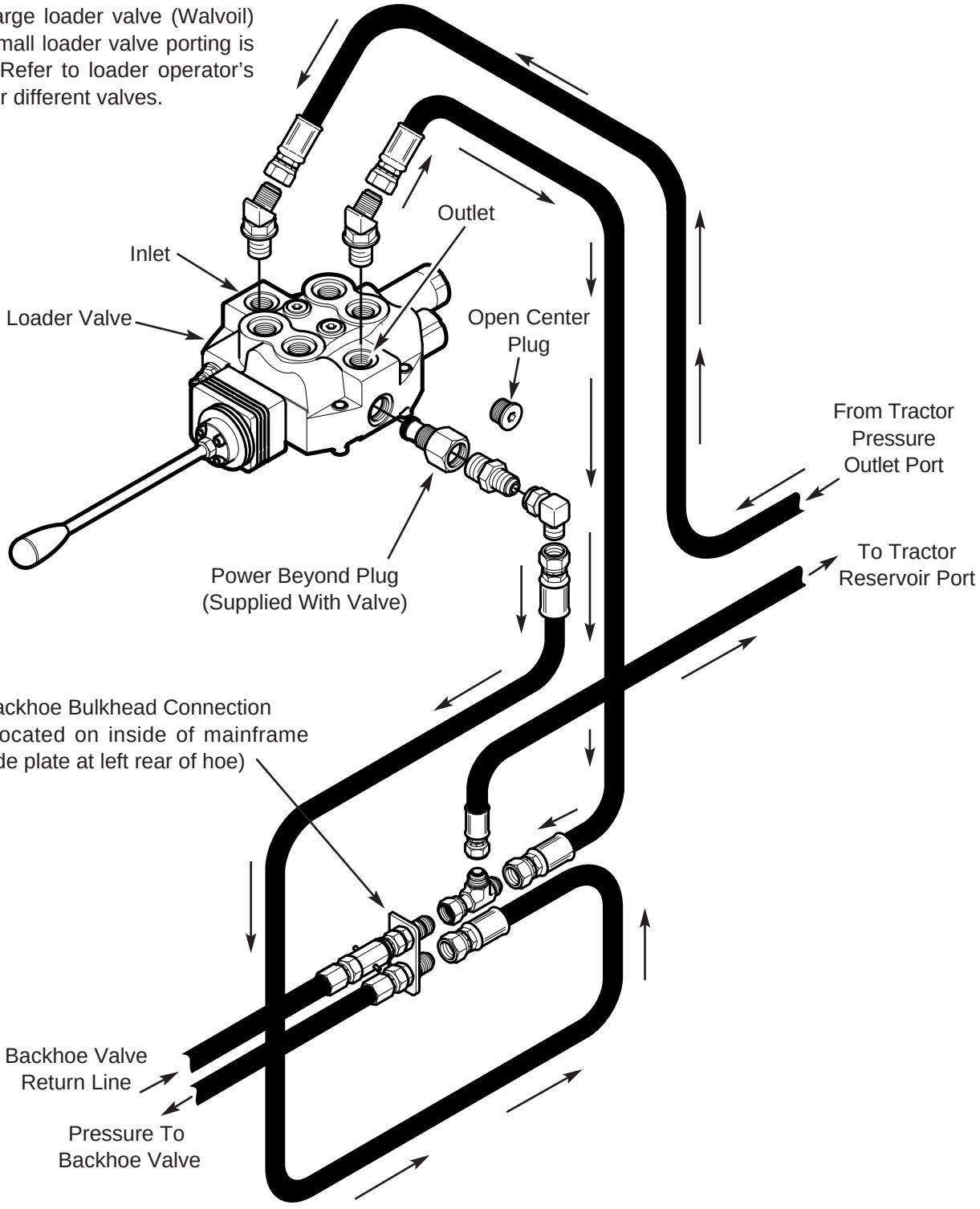
3. Install a pressure line (supplied by customer) between the power beyond fitting of the loader valve and the pressure inlet port on the backhoe bulkhead connection as shown in Figure 23.

4. Complete assembly of "return" hoses as shown in Figure 23. Connect tee fitting to return outlet port on the backhoe bulkhead connector as shown. Connect return hose from rerturn outlet port of the loader valve to the branch port of the tee fitting. Hoses and tee supplied by customer. Connect a second return hose from the tee fitting directly to a port on the tractor reservoir as shown in Figure 23.

BUSH HOG BACKHOE & BUSH HOG LOADER VALVE

Figure 23

NOTE: Large loader valve (Walvoil) shown. Small loader valve porting is different. Refer to loader operator's manual for different valves.


Outlet
Inlet
Bush Hog Loader Valve
Open Center Plug
From Tractor Pressure Outlet Port
To Tractor Reservoir Port
Power Beyond Plug (Supplied With Valve)
Backhoe Bulkhead Connection (Located on inside of mainframe side plate at left rear of hoe)
Backhoe Valve Return Line
Pressure To Backhoe Valve

IMPORTANT: Never connect the return hose to a tractor remote coupler which can be pressurized. Accidental pressurization can cause serious damage to backhoe valve.

SECOND PROCEDURE

ASSEMBLY OF A BUSH HOG BACKHOE TO A NON BUSH HOG LOADER VALVE - OR - BUSH HOG BACKHOE TO LOADER VALVE USING PTO PUMP KIT OPTION

Assembly of a Bush Hog backhoe to a non-Bush Hog loader valve, OR a Bush Hog Backhoe to a loader valve using the PTO Pump Kit option.

IMPORTANT:

- ***Improper hydraulic hook-up can cause serious damage to the backhoe control valve, loader valve, tractor valve, and other hydraulic components.***
- ***The pressure supply line from the PTO pump must be connected to the pressure inlet port on the backhoe bulkhead connection whether using a Bush Hog loader valve or a non-Bush Hog loader valve. <u>Never</u> connect the pressure supply line from the PTO pump to the loader valve pressure inlet port because excessive pressure will build up resulting in damage to the PTO pump.***

The following instructions are to be used to connect the backhoe valve in line with a loader valve that is not a Bush Hog loader valve. When connecting the Bush Hog backhoe valve to a loader valve other than one obtained from Bush Hog, the input pressure line from the tractor will be connected to the pressure port on the backhoe bulkhead connection first. In order to properly plumb the system, the backhoe valve will require converting to a power beyond valve. The power beyond pressure line from the backhoe valve will be connected to the input pressure port of the loader valve. The power beyond kit for the backhoe being assembled must be ordered as a separate item from Bush Hog.

Assembly

1. Remove the front cover that encloses the backhoe valve within the control console.

2. Carefully clean the top and front sides of the backhoe valve and remove the large “Port C” plug located on the front of the right hand end section of the valve.

3. Install power beyond / closed center plug inside of port. Make sure power beyond / closed center plug is tightly engaged.

4. Install 90° male adapter into “C” port with open end of adapter (JIC side) oriented so that it points down and towards the right side of the backhoe.

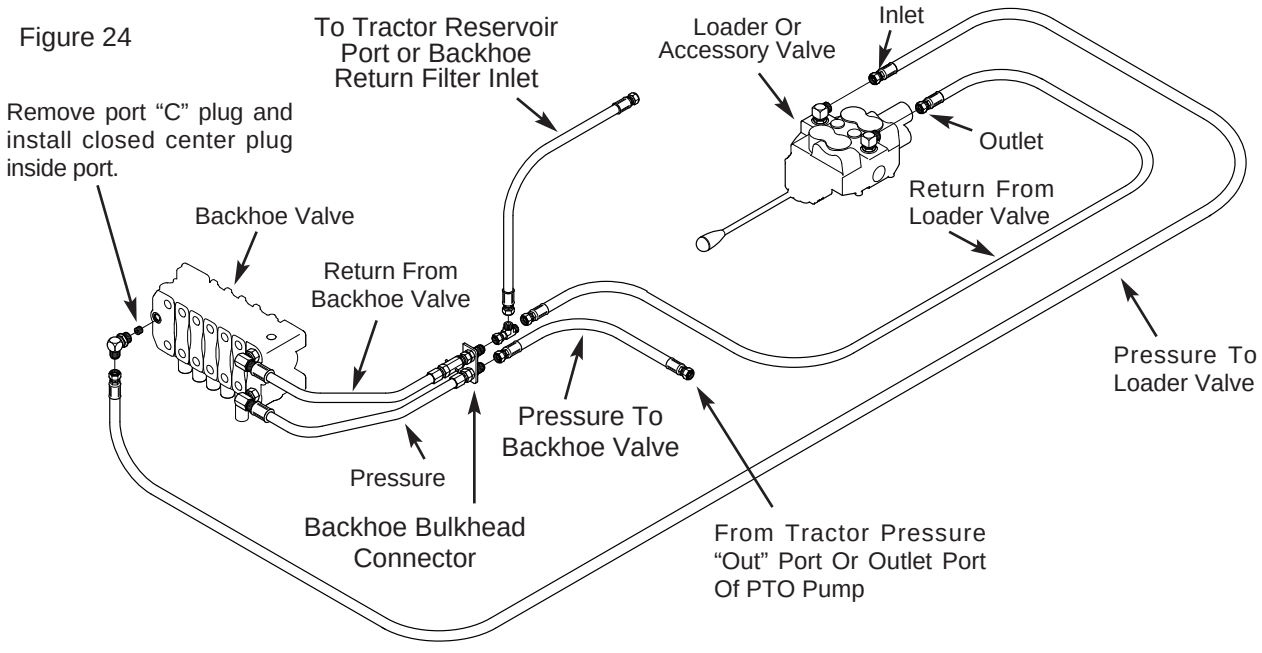
5. Connect hydraulic hose (supplied by customer) to 90° male adapter. The hydraulic hose should have the same pressure rating as the original pressure hose to the loader or other accessory valve.

6. Connect the other end of the hydraulic hose to the pressure port of the loader or accessory valve using fittings (supplied by customer) as required. Refer to Figure 24.

7. Complete assembly of the backhoe “pressure” and “return” hydraulic hoses and a tee fitting (all supplied by customer) as shown.

8. Complete assembly of the loader or accessory valve “return” hydraulic hose (supplied by customer) to the tee fitting as shown.

Figure 24


To Tractor Reservoir Port or Backhoe Return Filter Inlet
Loader Or Accessory Valve
Inlet
Remove port “C” plug and install closed center plug inside port.
Outlet
Backhoe Valve
Return From Loader Valve
Return From Backhoe Valve
Pressure To Loader Valve
Pressure To Backhoe Valve
Pressure
Backhoe Bulkhead Connector
From Tractor Pressure “Out” Port Or Outlet Port Of PTO Pump

FLOW DIVIDER KIT (Optional)

General Description

The Flow Divider Kit consists of those parts required to power the backhoe from tractors or skid steer loaders that have hydraulic flow rates above 12 gallons per minute (gpm). It includes the flow divider valve, hydraulic hoses to connect the valve to the backhoe, and adapter fittings. This kit does not include the hoses required to connect the flow divider valve to the tractor or skid steer loader. These hoses may be obtained from your local dealership and must have 7/8" - 14 JIC (37°flare) female threads to connect to the flow divider valve.

NOTE - *Tighten all hardware to the torque requirements specified in the torque chart.*

Assembly

IMPORTANT - If hoses are hooked-up incorrectly, serious damage to the backhoe valve will result. DO NOT use thread sealant on union ends of adapters. DO NOT over-tighten fittings - they can split or expand causing hydraulic fluid leakage.

Figure 25
FLOW DIVIDER VALVE TO BACKHOE MOUNTING

Backhoe Mounted to Tractor

1. Assemble three 90° male adapters (10) to flow divider valve as shown in Figure 25.

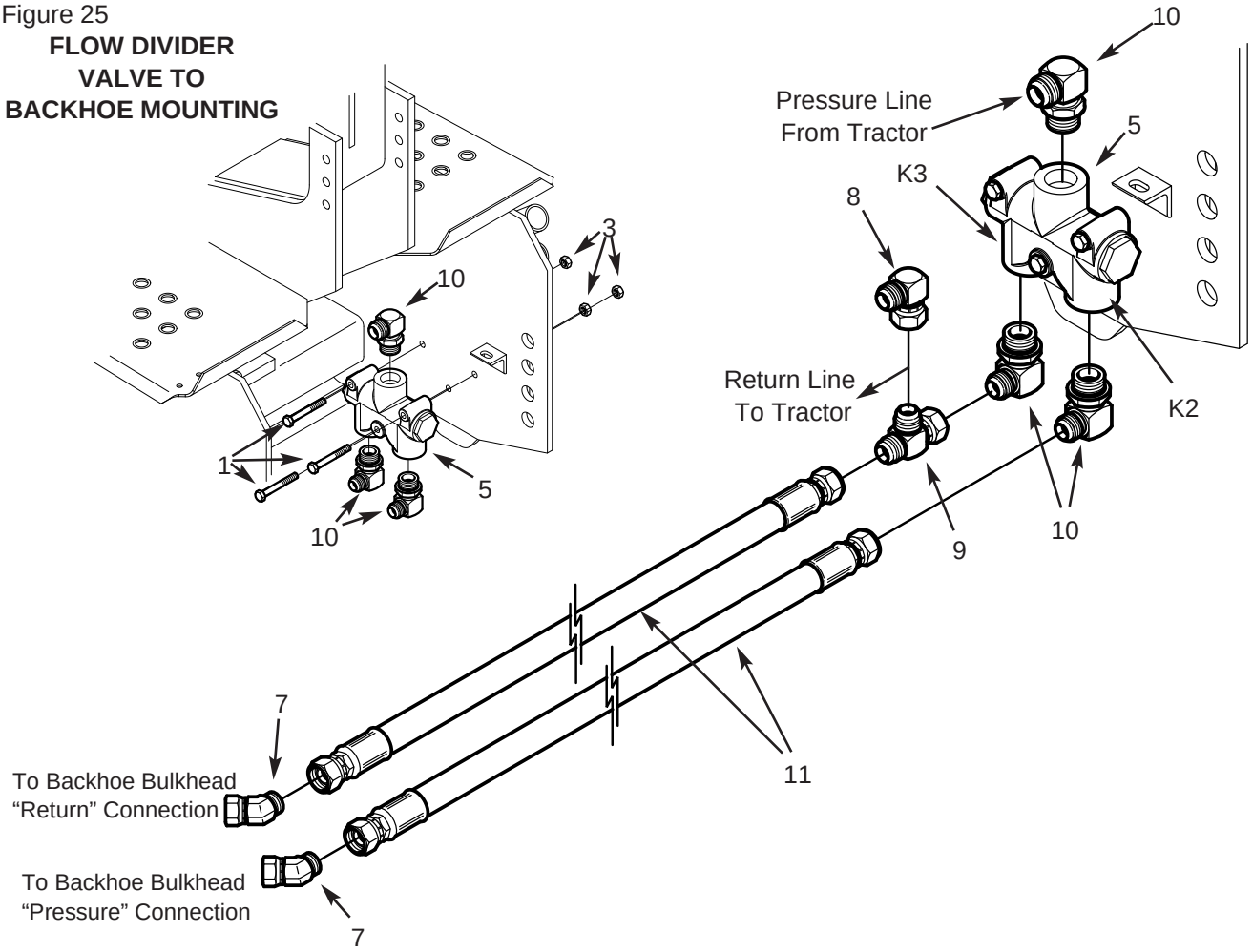
2. Assemble flow divider valve (5) to backhoe - mount valve to inside face of right hand side plate using 5/16" x 2-1/2" bolts (1) and lock nuts (3). Orient valve so that wording on valve can be read after valve is mounted to backhoe.

3. Assemble JIC swivel run tee (9) to proper port on flow divider valve according to instructions that follow.

Tractors with an auxiliary hydraulic flow of 15 gpm or less

Connect JIC swivel run tee (9) to 90° male adapter (10) on "K3" port on valve as shown in Figure 26.

Figure 26
FOR TRACTOR HYDRAULIC FLOW OF 15 GPM OR LESS



Tractors with an auxiliary hydraulic flow greater than 15 gpm

Connect JIC swivel run tee (9) to 90° male adapter (10) on "K2" port on valve as shown in Figure 27.

IMPORTANT - The location of the JIC swivel run tee will ensure that proper flow is provided to the backhoe for smooth operation. The flow into the valve from the tractor is divided between the two outlet ports "K2" and "K3". The hydraulic flow is split so that 60% is flowing from the "K2" port and 40% is flowing from the "K3" port.

4. Assemble 90° JIC adapter (8) to branch port of swivel run tee fitting (9).

5. Assemble 45° JIC adapters (7) to both "In/Pressure" and "Out/Return" ports on the backhoe bulkhead connection.

6. Connect 24" hydraulic hose (11) between 45° JIC adapter (7) on backhoe "In/Pressure" bulkhead connection and single 90° male adapter (10) located under flow divider valve.

7. Connect 24" hydraulic hose (11) between 45° JIC adapter (7) on backhoe "Out/Return" bulkhead connection and JIC swivel run tee (9) on flow divider valve.

8. Assemble quick coupler (supplied by customer) to pressure line hydraulic hose (supplied by customer) and connect free end of hose to 90° male adapter (10) at top of flow divider valve.

9. Assemble quick coupler (supplied by customer) to return line hydraulic hose (supplied by customer) and connect free end of hose to 90° JIC adapter (8) on flow divider valve.

10. Carefully route pressure and return line hydraulic hoses to tractor remote hydraulic connections. Remove dust caps from tractor remote hydraulic connections and connect hoses to the appropriate port on tractor.

Testing Backhoe Hydraulic Hook-Up

1. Start tractor engine.

2. Set parking brake and engage tractor remote hydraulics so that oil flows to backhoe. NOTE! Consult tractor Operator's Manual for proper operation.

3. Exit tractor and sit in backhoe operator's seat.

4. To remove air from backhoe hydraulic system, slowly cycle all backhoe functions (stabilizers, boom, dipperstick, bucket, and swing) several times. Be sure to cycle stabilizers first and then lower both stabilizer arms into operating position before cycling other backhoe functions.

5. Exit backhoe, disengage tractor remote hydraulics, stop engine, and check tractor hydraulic fluid level.

Backhoe Mounted to Skid Steer Loader

1. Assemble 90° male adapter (10) to inlet port at bottom of flow divider valve as shown in Figure 28.

2. Assemble flow divider valve (5) to Bush Hog skid steer adapter using 5/16" x 2-1/2" bolts (1) and lock nuts (3), 5/8" x 1" bolts (2), 5/8" lockwashers (4) and valve mount plate (12). Orient valve so that wording on valve can be read after valve is mounted to skid steer adapter.

3. Assemble remainder of fittings to flow divider valve according to instructions that follow.

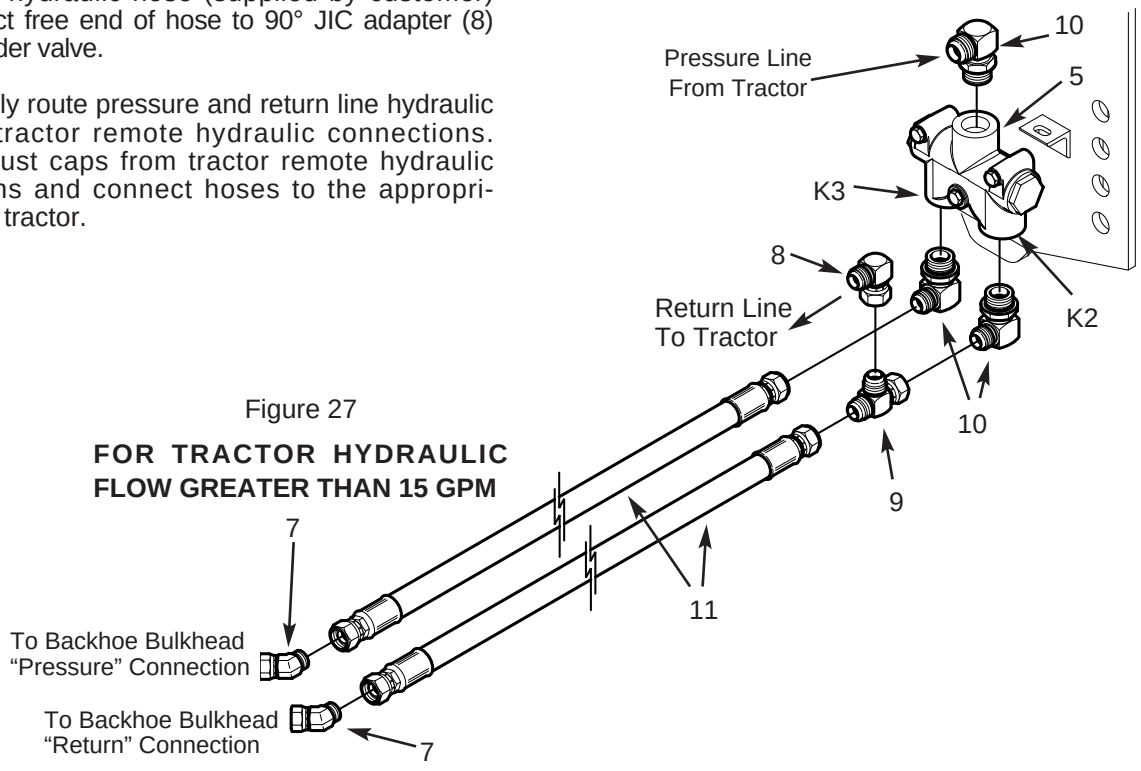


Figure 27

FOR TRACTOR HYDRAULIC FLOW GREATER THAN 15 GPM

Skid Steers with an auxiliary hydraulic flow of 15 gpm or less - Figure 29

Assemble straight male adapter (6) to “K3” port on valve as shown in Figure 29. Assemble JIC swivel run tee (9) to straight male adapter (6). Assemble 90° male adapter (10) to “K2” port on valve.

Skid Steers with an auxiliary hydraulic flow greater than 15 gpm - Figure 30

Assemble straight male adapter (6) to “K2” port on valve as shown in Figure 30. Assemble JIC swivel run tee (9) to straight adapter (6). Assemble 90° male adapter (10) to “K3” port on valve.

IMPORTANT - The location of the JIC swivel run tee will ensure that proper flow is provided to the backhoe for smooth operation. The flow into the valve from the skid steer is divided between the two outlet ports “K2” and “K3”. The hydraulic flow is split so that 60% is flowing from the “K2” port and 40% is flowing from the “K3” port.

4. Assemble 90° JIC adapter (8) to through port of swivel run tee fitting (9).

5. Assemble 45° JIC adapters (7) to both “In/Pressure” and “Out/Return” ports on the backhoe bulkhead connection.

6. Connect 24” hydraulic hose (11) between 45° JIC adapter (7) on backhoe “In/Pressure” bulkhead connection and single 90° male adapter (10) located on top of flow divider valve.

7. Connect 24” hydraulic hose (11) between 45° JIC adapter (7) on backhoe “Out/Return” bulkhead connection and JIC swivel run tee (9) on flow divider valve.

8. Assemble quick coupler (supplied by customer) to pressure line hydraulic hose (supplied by customer) and connect free end of hose to 90° male adapter (10) at bottom of flow divider valve.

9. Assemble quick coupler (supplied by customer) to return line hydraulic hose (supplied by customer) and connect free end of hose to 90° JIC adapter (8) on flow divider valve.

10. Carefully route pressure and return line hydraulic hoses to tractor hydraulic connections. Remove dust caps from tractor hydraulic connections and connect hoses to the appropriate port on tractor.

Testing Backhoe Hydraulic Hook-Up

1. Start skid steer loader engine.

2. Set parking brake and engage auxiliary boom hydraulics so that oil flows to backhoe. NOTE! Consult skid steer Operator’s Manual for proper operation.

3. Exit skid steer and sit in backhoe operator’s seat.

4. To remove air from backhoe hydraulic system, slowly cycle all backhoe functions (stabilizers, boom, dipperstick, bucket, and swing) several times. Be sure to cycle stabilizers first and then lower both stabilizer arms into operating position before cycling other backhoe functions.

5. Exit backhoe, disengage auxiliary boom hydraulics, stop engine, and check skid steer hydraulic fluid level.

Figure 28
FLOW DIVIDER VALVE TO SKID STEER ADAPTER MOUNTING

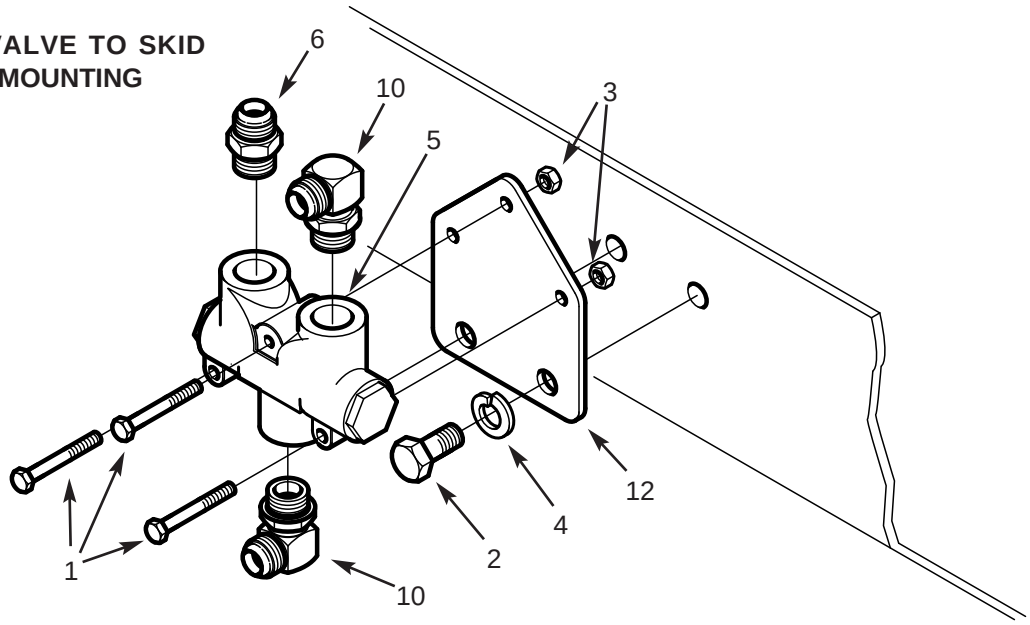


Figure 29
FOR SKID STEER HYDRAULIC FLOW OF 15 GPM OR LESS

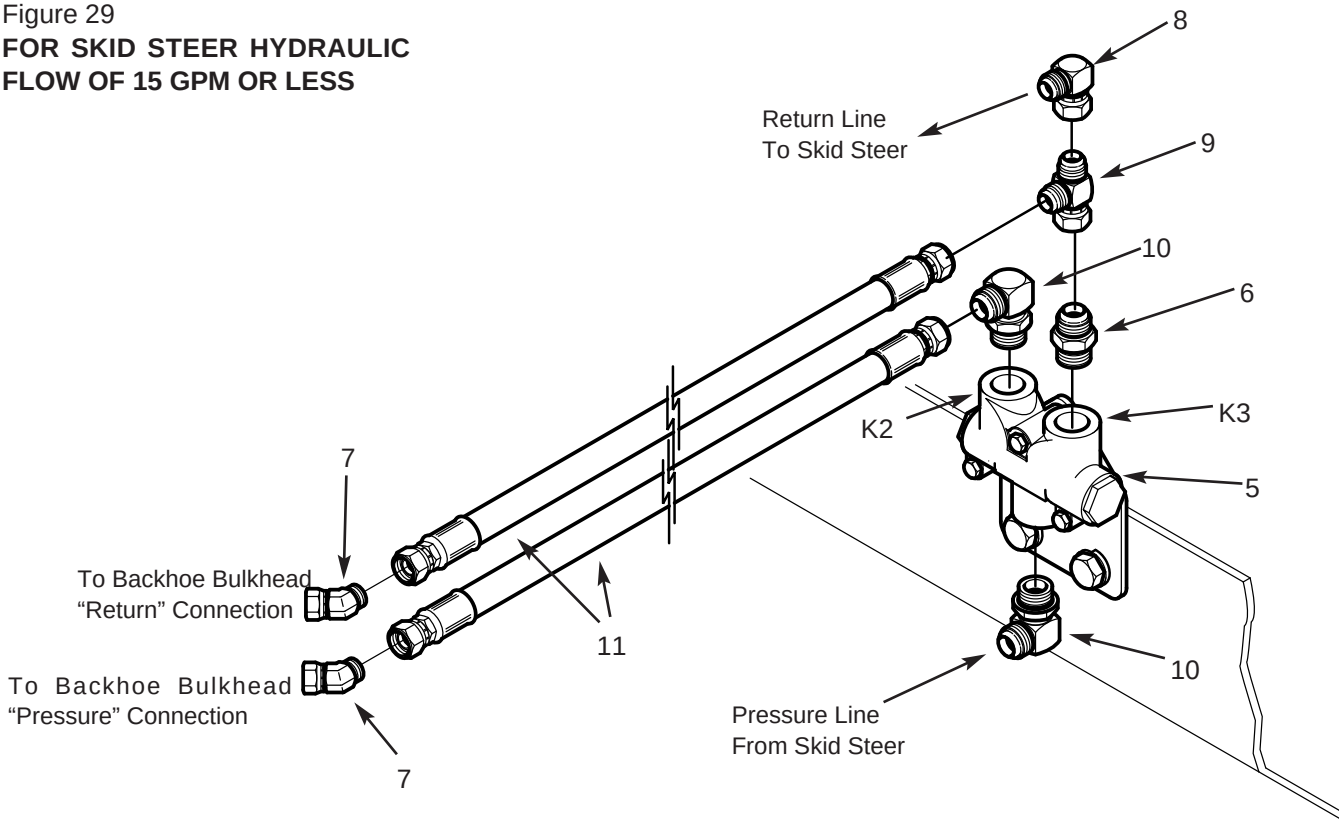
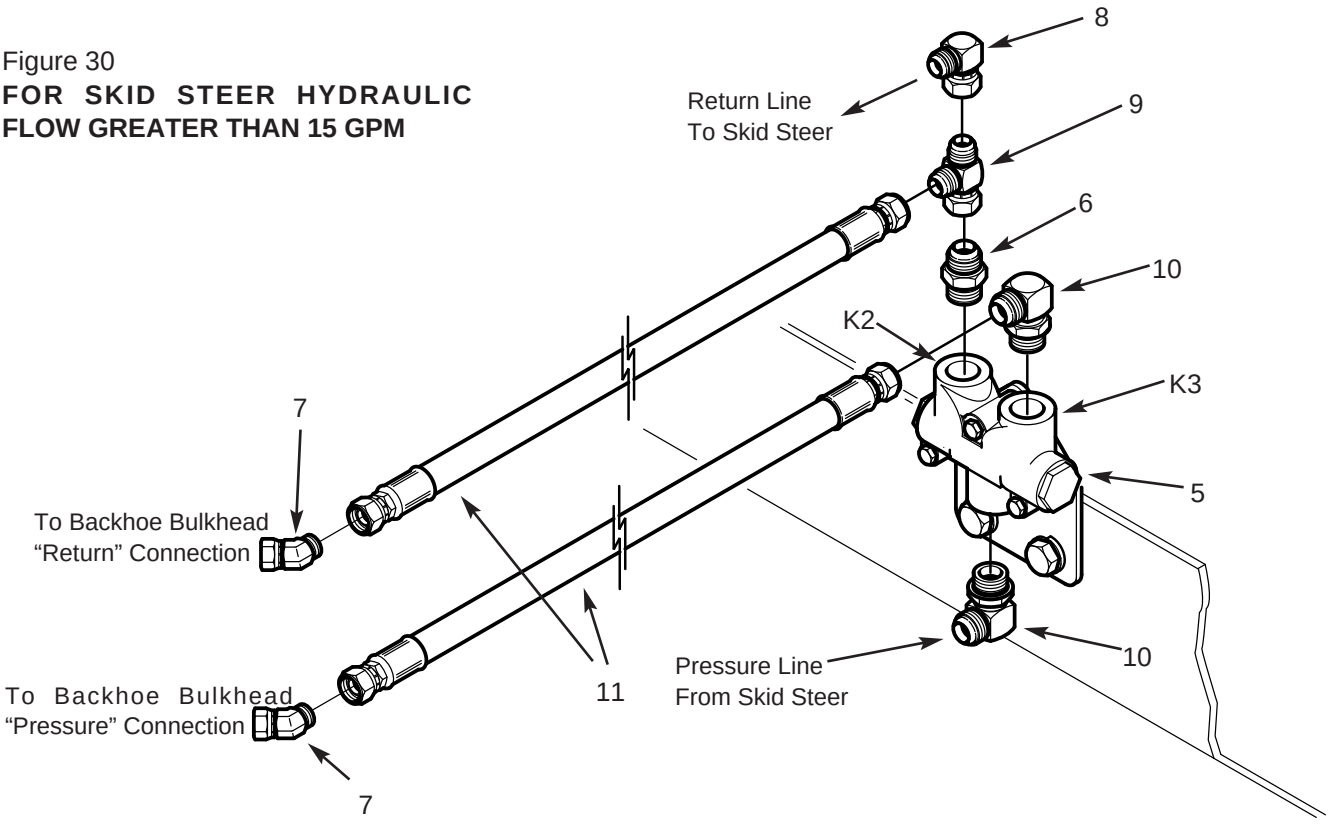
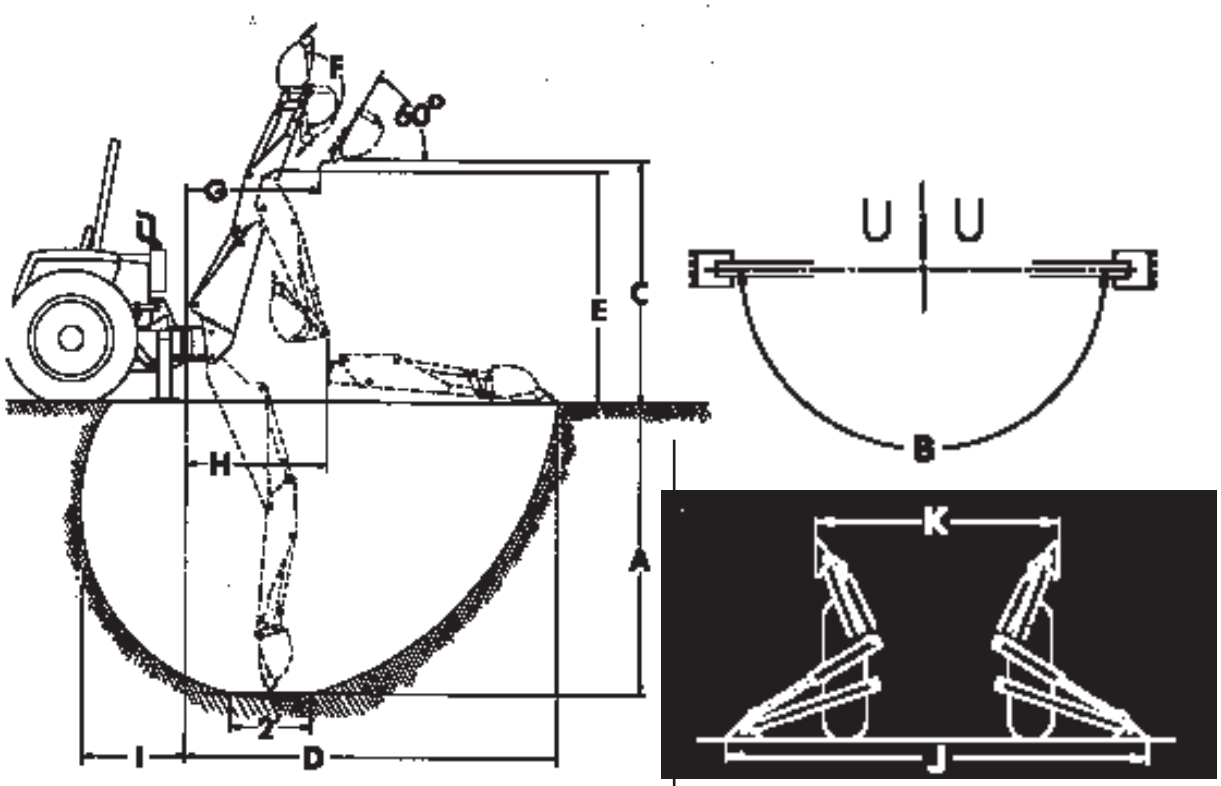


Figure 30
FOR SKID STEER HYDRAULIC FLOW GREATER THAN 15 GPM



BACKHOES - DIMENSIONS AND SPECIFICATIONS



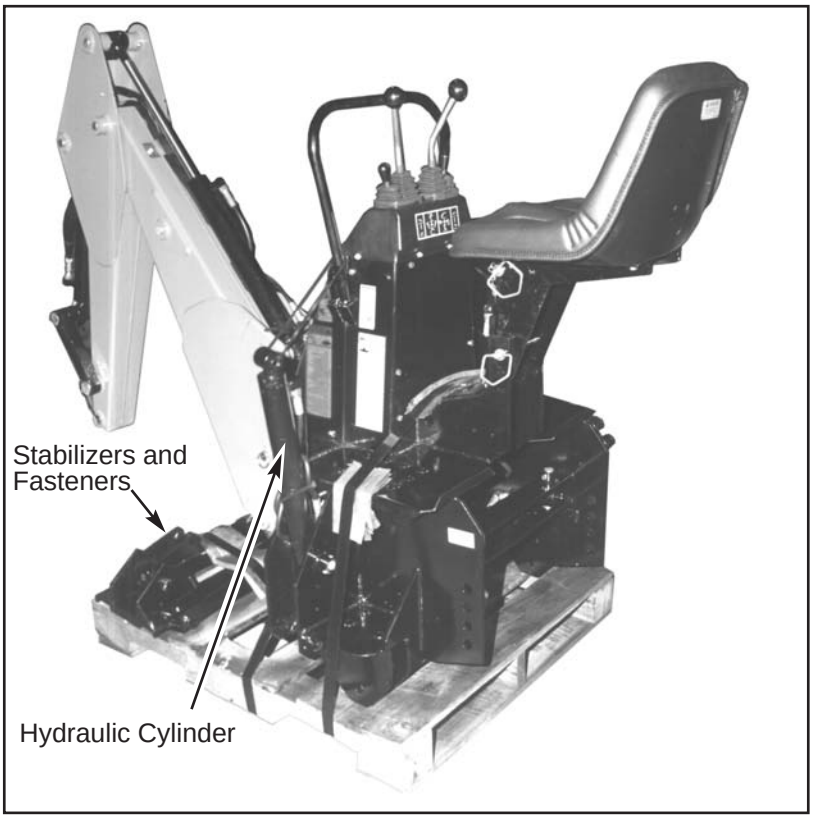
SERIES	BH650	BH750	BH850	BH950
Maximum Digging Depth	7’0”	8’0”	9’0”	10’0”
A. Digging Depth (two foot flat bottom)	6’6”	7’6”	8’6”	9’6”
B. Swing Arc	180°	180°	180°	180°
C. Loading Height (bucket at 60°)	4’4”	5’4”	6’8”	7’6”
D. Reach from Center Line of Swing Pivot	9’4”	10’	11’1”	12’4”
E. Transport Height (maximum)	5’6”	6’7”	6’11”	8’0”
F. Bucket Rotation	180°	180°	180°	180°
G. Loading Reach (bucket at 60°)	4’6”	3’9”	4’1”	4’7”
H. Transport Overhang	3’8”	3’9”	4’5”	4’9”
I. Undercut	2’6”	2’9”	3’	3’0”
J. Stabilizer Spread, down position	7’2”	7’2”	8’9”	8’9”
K. Stabilizer Spread, up position	3’7”	3’7”	4’7”	4’7”
Bucket Cylinder Digging Force	2970 lbs.	3380 lbs.	4023 lbs.	4668 lbs.
Dipperstick Cylinder Digging Force`	1480 lbs.	2240 lbs.	2445 lbs.	3261 lbs.
Hydraulic Volume Requirements	6 GPM	6 to 8 GPM	6 to 8 GPM	6 to 8 GPM
Hydraulic Pressure Requirements	2400 psi.	2400 psi.	2400 psi.	2400 psi.
Recommended Tractor HP Requirements	18 - 35 HP	25 - 50 HP	35 - 100 HP	55 - 100HP

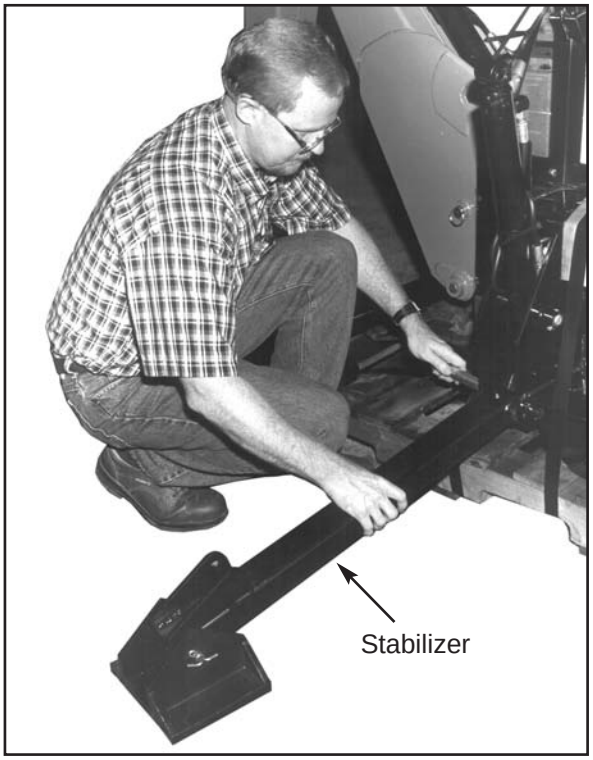
Specifications May Vary Depending on Tractor Model and are Subject to Change Without Notification. Tractors Must Be Equipped with ROPS and Seat belt That Will Provide Better Safety.

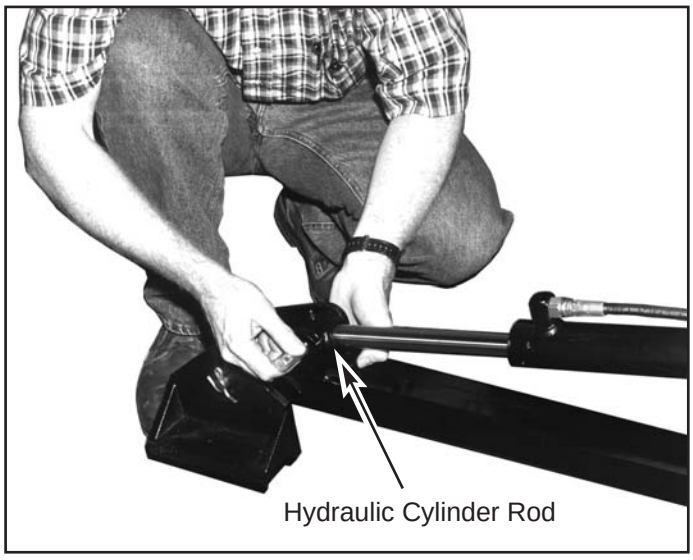
REPOSITION STABILIZER CYLINDERS BEFORE REMOVING BACKHOE FROM SHIPPING PALLET

Cylinder ports must be pointing upward and hoses routed above the cylinder to main-frame pivot pin connection.

Palletized backhoe as shipped from factory. Remove stabilizers and fasteners from pallet. Position stabilizer between mounting lugs and pin into place. Cut plastic ties from rod ends of hydraulic cylinders, swing down and pull rod end out to align with stabilizer mounting lugs. Pin into place with provided fasteners.







SAFETY DECALS

The safety of the operator was a prime consideration in the design of the backhoe. Proper shielding, convenient controls, simple adjustments and other safety features have been built into this implement. The following decals are located on the backhoe. Keep decals clean and replace them immediately if they are missing. Contact your dealer or Bush Hog for replacements.

WARNING
To avoid serious injury or death:
Do not operate this backhoe unless it is rigidly attached to the tactor using the appropriate factory - provided mounting kit. Do not mount backhoe on a 3-point "Quick Attaching Coupler".
50102293

50102293

CAUTION
Be sure to purge all the air from the hydraulic system before attempting to raise or lower this machine. Refer to operators manual for further details.
50100238

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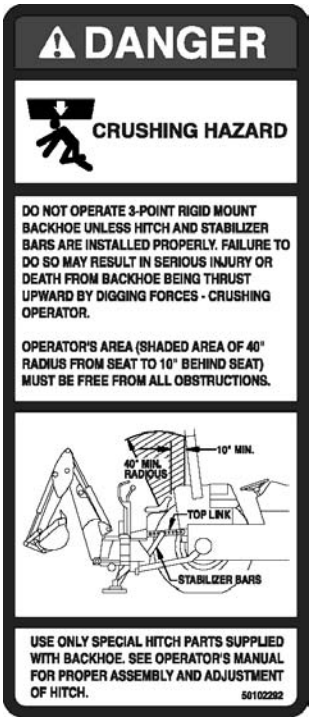
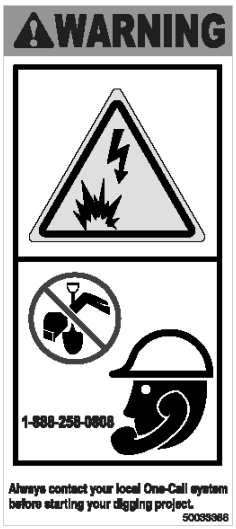

DANGER
CRUSHING HAZARD
DO NOT OPERATE 3-POINT RIGID MOUNT BACKHOE UNLESS HITCH AND STABILIZER BARS ARE INSTALLED PROPERLY. FAILURE TO DO SO MAY RESULT IN SERIOUS INJURY OR DEATH FROM BACKHOE BEING THRUST UPWARD BY DIGGING FORCES - CRUSHING OPERATOR.
OPERATOR'S AREA (SHADED AREA OF 40" RADIUS FROM SEAT TO 10" BEHIND SEAT) MUST BE FREE FROM ALL OBSTRUCTIONS.
10" MIN.
40" MIN. RADIUS
TOP LINK
STABILIZER BARS
USE ONLY SPECIAL HITCH PARTS SUPPLIED WITH BACKHOE. SEE OPERATOR'S MANUAL FOR PROPER ASSEMBLY AND ADJUSTMENT OF HITCH.
50102292

50102292

WARNING
Raised backhoe boom, dipperstick and bucket can fall from hydraulic system failure. To avoid serious injury or death:
• Block up or securely support backhoe boom and dipperstick before working underneath.
• Do not use hand or skin to check for hydraulic leaks. Use cardboard or wood. Wear eye protection.
• High pressure oil leaks can penetrate skin causing serious injury and gangrene. consult a physician immediately.
• Lower backhoe to ground and release hydraulic pressure before loosening fittings.
• Refer to operators manual for details.
50033364

50033364



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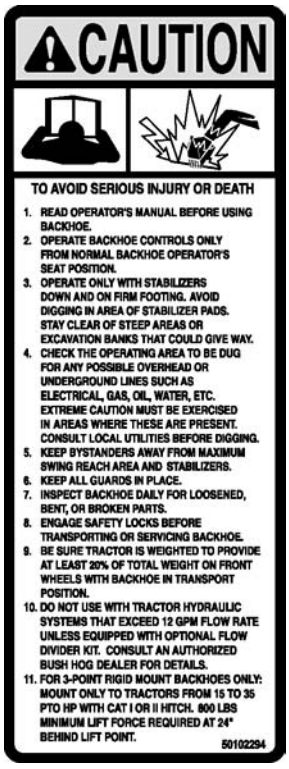
CAUTION
TO AVOID SERIOUS INJURY OR DEATH
1. READ OPERATOR'S MANUAL BEFORE USING BACKHOE.
2. OPERATE BACKHOE CONTROLS ONLY FROM NORMAL BACKHOE OPERATOR'S SEAT POSITION.
3. OPERATE ONLY WITH STABILIZERS DOWN AND ON FIRM FOOTING. AVOID DIGGING IN AREA OF STABILIZER PADS. STAY CLEAR OF STEEP AREAS OR EXCAVATION BANKS THAT COULD GIVE WAY.
4. CHECK THE OPERATING AREA TO BE DUG FOR ANY POSSIBLE OVERHEAD OR UNDERGROUND LINES SUCH AS ELECTRICAL, GAS, OIL, WATER, ETC. EXTREME CAUTION MUST BE EXERCISED IN AREAS WHERE THESE ARE PRESENT. CONSULT LOCAL UTILITIES BEFORE DIGGING.
5. KEEP BYSTANDERS AWAY FROM MAXIMUM SWING REACH AREA AND STABILIZERS.
6. KEEP ALL GUARDS IN PLACE.
7. INSPECT BACKHOE DAILY FOR LOOSENED, BENT, OR BROKEN PARTS.
8. ENGAGE SAFETY LOCKS BEFORE TRANSPORTING OR SERVICING BACKHOE.
9. BE SURE TRACTOR IS WEIGHTED TO PROVIDE AT LEAST 20% OF TOTAL WEIGHT ON FRONT WHEELS WITH BACKHOE IN TRANSPORT POSITION.
10. DO NOT USE WITH TRACTOR HYDRAULIC SYSTEMS THAT EXCEED 12 GPM FLOW RATE UNLESS EQUIPPED WITH OPTIONAL FLOW DIVIDER KIT. CONSULT AN AUTHORIZED BUSH HOG DEALER FOR DETAILS.
11. FOR 3-POINT RIGID MOUNT BACKHOES ONLY: MOUNT ONLY TO TRACTORS FROM 15 TO 35 PTO HP WITH CAT I OR II HITCH. 800 LBS MINIMUM LIFT FORCE REQUIRED AT 24" BEHIND LIFT POINT.
50102294

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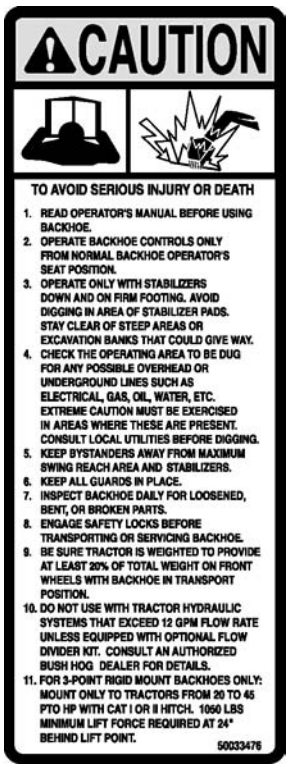
CAUTION
TO AVOID SERIOUS INJURY OR DEATH
1. READ OPERATOR'S MANUAL BEFORE USING BACKHOE.
2. OPERATE BACKHOE CONTROLS ONLY FROM NORMAL BACKHOE OPERATOR'S SEAT POSITION.
3. OPERATE ONLY WITH STABILIZERS DOWN AND ON FIRM FOOTING. AVOID DIGGING IN AREA OF STABILIZER PADS. STAY CLEAR OF STEEP AREAS OR EXCAVATION BANKS THAT COULD GIVE WAY.
4. CHECK THE OPERATING AREA TO BE DUG FOR ANY POSSIBLE OVERHEAD OR UNDERGROUND LINES SUCH AS ELECTRICAL, GAS, OIL, WATER, ETC. EXTREME CAUTION MUST BE EXERCISED IN AREAS WHERE THESE ARE PRESENT. CONSULT LOCAL UTILITIES BEFORE DIGGING.
5. KEEP BYSTANDERS AWAY FROM MAXIMUM SWING REACH AREA AND STABILIZERS.
6. KEEP ALL GUARDS IN PLACE.
7. INSPECT BACKHOE DAILY FOR LOOSENED, BENT, OR BROKEN PARTS.
8. ENGAGE SAFETY LOCKS BEFORE TRANSPORTING OR SERVICING BACKHOE.
9. BE SURE TRACTOR IS WEIGHTED TO PROVIDE AT LEAST 20% OF TOTAL WEIGHT ON FRONT WHEELS WITH BACKHOE IN TRANSPORT POSITION.
10. DO NOT USE WITH TRACTOR HYDRAULIC SYSTEMS THAT EXCEED 12 GPM FLOW RATE UNLESS EQUIPPED WITH OPTIONAL FLOW DIVIDER KIT. CONSULT AN AUTHORIZED BUSH HOG DEALER FOR DETAILS.
11. FOR 3-POINT RIGID MOUNT BACKHOES ONLY: MOUNT ONLY TO TRACTORS FROM 20 TO 45 PTO HP WITH CAT I OR II HITCH. 1050 LBS MINIMUM LIFT FORCE REQUIRED AT 24" BEHIND LIFT POINT.
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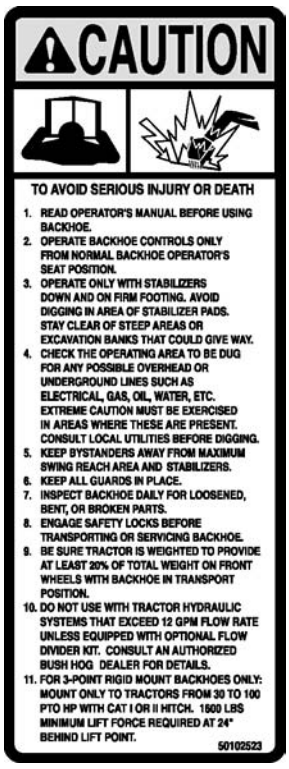
CAUTION
TO AVOID SERIOUS INJURY OR DEATH
1. READ OPERATOR'S MANUAL BEFORE USING BACKHOE.
2. OPERATE BACKHOE CONTROLS ONLY FROM NORMAL BACKHOE OPERATOR'S SEAT POSITION.
3. OPERATE ONLY WITH STABILIZERS DOWN AND ON FIRM FOOTING. AVOID DIGGING IN AREA OF STABILIZER PADS. STAY CLEAR OF STEEP AREAS OR EXCAVATION BANKS THAT COULD GIVE WAY.
4. CHECK THE OPERATING AREA TO BE DUG FOR ANY POSSIBLE OVERHEAD OR UNDERGROUND LINES SUCH AS ELECTRICAL, GAS, OIL, WATER, ETC. EXTREME CAUTION MUST BE EXERCISED IN AREAS WHERE THESE ARE PRESENT. CONSULT LOCAL UTILITIES BEFORE DIGGING.
5. KEEP BYSTANDERS AWAY FROM MAXIMUM SWING REACH AREA AND STABILIZERS.
6. KEEP ALL GUARDS IN PLACE.
7. INSPECT BACKHOE DAILY FOR LOOSENED, BENT, OR BROKEN PARTS.
8. ENGAGE SAFETY LOCKS BEFORE TRANSPORTING OR SERVICING BACKHOE.
9. BE SURE TRACTOR IS WEIGHTED TO PROVIDE AT LEAST 20% OF TOTAL WEIGHT ON FRONT WHEELS WITH BACKHOE IN TRANSPORT POSITION.
10. DO NOT USE WITH TRACTOR HYDRAULIC SYSTEMS THAT EXCEED 12 GPM FLOW RATE UNLESS EQUIPPED WITH OPTIONAL FLOW DIVIDER KIT. CONSULT AN AUTHORIZED BUSH HOG DEALER FOR DETAILS.
11. FOR 3-POINT RIGID MOUNT BACKHOES ONLY: MOUNT ONLY TO TRACTORS FROM 30 TO 100 PTO HP WITH CAT I OR II HITCH. 1500 LBS MINIMUM LIFT FORCE REQUIRED AT 24" BEHIND LIFT POINT.
50102523

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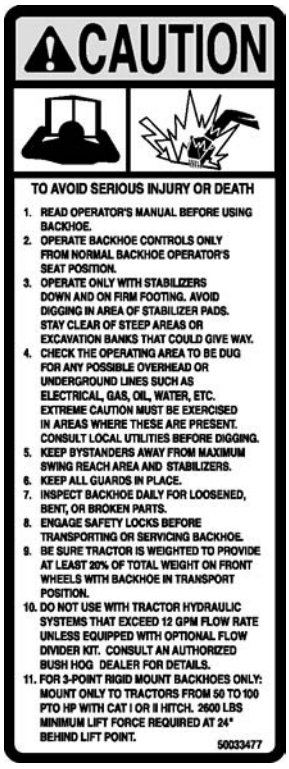
CAUTION
TO AVOID SERIOUS INJURY OR DEATH
1. READ OPERATOR'S MANUAL BEFORE USING BACKHOE.
2. OPERATE BACKHOE CONTROLS ONLY FROM NORMAL BACKHOE OPERATOR'S SEAT POSITION.
3. OPERATE ONLY WITH STABILIZERS DOWN AND ON FIRM FOOTING. AVOID DIGGING IN AREA OF STABILIZER PADS. STAY CLEAR OF STEEP AREAS OR EXCAVATION BANKS THAT COULD GIVE WAY.
4. CHECK THE OPERATING AREA TO BE DUG FOR ANY POSSIBLE OVERHEAD OR UNDERGROUND LINES SUCH AS ELECTRICAL, GAS, OIL, WATER, ETC. EXTREME CAUTION MUST BE EXERCISED IN AREAS WHERE THESE ARE PRESENT. CONSULT LOCAL UTILITIES BEFORE DIGGING.
5. KEEP BYSTANDERS AWAY FROM MAXIMUM SWING REACH AREA AND STABILIZERS.
6. KEEP ALL GUARDS IN PLACE.
7. INSPECT BACKHOE DAILY FOR LOOSENED, BENT, OR BROKEN PARTS.
8. ENGAGE SAFETY LOCKS BEFORE TRANSPORTING OR SERVICING BACKHOE.
9. BE SURE TRACTOR IS WEIGHTED TO PROVIDE AT LEAST 20% OF TOTAL WEIGHT ON FRONT WHEELS WITH BACKHOE IN TRANSPORT POSITION.
10. DO NOT USE WITH TRACTOR HYDRAULIC SYSTEMS THAT EXCEED 12 GPM FLOW RATE UNLESS EQUIPPED WITH OPTIONAL FLOW DIVIDER KIT. CONSULT AN AUTHORIZED BUSH HOG DEALER FOR DETAILS.
11. FOR 3-POINT RIGID MOUNT BACKHOES ONLY: MOUNT ONLY TO TRACTORS FROM 50 TO 100 PTO HP WITH CAT I OR II HITCH. 2600 LBS MINIMUM LIFT FORCE REQUIRED AT 24" BEHIND LIFT POINT.
50033477

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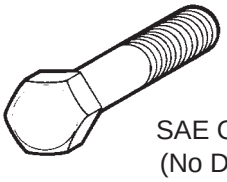
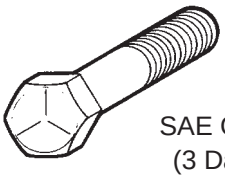
TORQUE SPECIFICATIONS

AMERICAN

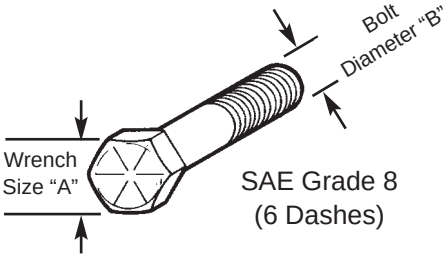
Bolt Head Markings



SAE Grade 2
(No Dashes)



SAE Grade 5
(3 Dashes)

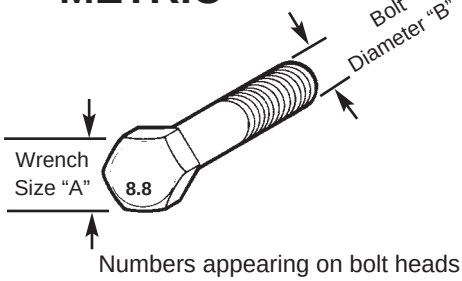


SAE Grade 8
(6 Dashes)

Proper toque for American fasteners used on Bush Hog equipment.
Recommended Torque in Foot Pounds (Newton Meters).*

WRENCH SIZE (IN.) "A"	BOLT DIAMETER (IN.) "B" AND THREAD SIZE	SAE GRADE 2	SAE GRADE 5	SAE GRADE 8
7/16	1/4 - 2O UNC	6 (7)	8 (11)	12 (16)
7/16	1/4 - 28 UNF	6 (8)	10 (13)	14 (18)
1/2	5/16 - 18 UNC	11 (15)	17 (23)	25 (33)
1/2	5/16 - 24 UNF	13 (17)	19 (26)	27 (37)
9/16	3/8 - 16 UNC	20 (27)	31 (42)	44 (60)
9/16	3/8 - 24 UNF	23 (31)	35 (47)	49 (66)
5/8	7/16 - 14 UNC	32 (43)	49 (66)	70 (95)
5/8	7/16 - 20 UNF	36 (49)	55 (75)	78 (106)
3/4	1/2 - 13 UNC	49 (66)	76 (103)	106 (144)
3/4	1/2 - 20 UNF	55 (75)	85 (115)	120 (163)
7/8	9/16 - 12 UNC	70 (95)	109 (148)	153 (207)
7/8	9/16 - 18 UNF	79 (107)	122 (165)	172 (233)
15/16	5/8 - 11 UNC	97 (131)	150 (203)	212 (287)
15/16	5/8 - 18 UNF	110 (149)	170 (230)	240 (325)
1-1/8	3/4 - 10 UNC	144 (195)	266 (360)	376 (509)
1-1/8	3/4 - 16 UNF	192 (260)	297 (402)	420 (569)
1-5/16	7/8 - 9 UNC	166 (225)	430 (583)	606 (821)
1-5/16	7/8 - 14 UNF	184 (249)	474 (642)	668 (905)
1-1/2	1 - 8 UNC	250 (339)	644 (873)	909 (1232)
1-1/2	1 - 12 UNF	274 (371)	705 (955)	995 (1348)
1-1/2	1 - 14 UNF	280 (379)	721 (977)	1019 (1381)
1-11/16	1-1/8 - 7 UNC	354 (480)	795 (1077)	1288(1745)
1-11/16	1-1/8 - 12 UNF	397 (538)	890 (1206)	1444 (1957)
1-7/8	1-1/4 - 7 UNC	500 (678)	1120 (1518)	1817 (2462)
1-7/8	1-1/4 - 12 UNF	553 (749)	1241 (1682)	2013 (2728)
2-1/16	1-3/8 - 6 UNC	655 (887)	1470 (1992)	2382 (3228)
2-1/16	1-3/8 - 12 UNF	746 (1011)	1672 (2266)	2712 (3675)
2-1/4	1-1/2 - 6 UNC	870 (1179)	1950 (2642)	3161 (4283)
2-1/4	1-1/2 - 12 UNF	979 (1327)	2194 (2973)	3557 (4820)

METRIC



Numbers appearing on bolt heads indicate ASTM class.

Proper torque for metric fasteners used on Bush Hog equipment.
Recommended torque in foot pounds (newton Meters).*

—WRENCH SIZE (mm) "A"	BOLT DIA. (mm) "B"	ASTM 4.6	ASTM 8.8	ASTM 9.8	ASTM 10.9
8	5	1.8 (2.4)		5.1 (6.9)	6.5 (8.8)
10	6	3 (4)		8.7 (12)	11.1 (15)
13	8	7.3 (10)		21.1 (29)	27 (37)
16	10	14.5 (20)		42 (57)	53 (72)
18	12	25 (34)	74 (100)	73 (99)	93 (126)
21	14	40 (54)	118 (160)	116 (157)	148 (201)
24	16	62 (84)	167 (226)	181 (245)	230 (312)
30	20	122 (165)	325 (440)		449 (608)
33	22		443 (600)		611 (828)
36	24	211 (286)	563 (763)		778 (1054)
41	27		821 (1112)		1138 (1542)
46	30	418 (566)	1119 (1516)		1547 (2096)

*Use 75% of the specified torque value for plated fasteners. Use 85% of the specified torque values for lubricated fasteners.

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